

DISTRIBUTION STANDARD SYSTEM (DSS)

EQUIPMENT CONTROL SYSTEM (ECS)

INTERFACE DESIGN DESCRIPTION (IDD) (DI-IPSC-81436)

Revision 7/Change 16



U.S. DEPARTMENT OF DEFENSE
DEFENSE LOGISTICS AGENCY
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Official Signatures

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1.0 **SCOPE**

1.1 **Identification**

This document establishes the Interface Design Description (IDD) for the creation of the Equipment Control System (ECS) for installation at the following locations:

- Defense Distribution Depot San Diego, CA (DDDC)
- Defense Distribution Depot Norfolk, VA (DDNV)
- Defense Distribution Depot Jacksonville, FL (DDJF)
- Defense Distribution Depot Puget Sound, WA (DDPW)
- Defense Distribution Depot Hill, UT (DDHU)
- Defense Distribution Depot at Mechanicsburg, PA (DDSP-W IMC),
- Defense Distribution Depot at Richmond, VA (DDRV),
- Defense Distribution Depot at New Cumberland, PA (DDSP-E EDC),
- Defense Distribution Depot Pearl Harbor, HI (DDPH)
- Defense Distribution Depot Guam, (DDPH)
- Defense Distribution Depot Yokosuka, Japan (DDYJ)
- Defense Distribution Depot Oklahoma City, OK (DDOO)
- Defense Distribution Depot at Tracy, CA (DDJC-Tracy)
- Defense Distribution Depot at Red River, TX (DDRT)
- Defense Distribution Mapping Activity at Richmond, VA (DDMA)
- Defense Distribution Depot Europe at Germersheim, Germany (DDDE)

The requirements/concept address all software resident on PC or workstation-sized computers which will drive the following and offer a communications interface with DSS (Upper Tier) functions for the following:

- NISTARS Laser Scanner Controller (NLSC),
- NISTARS Automated Storage and Retrieval System (ASRS) Controller (NMC),
- Navy STACKMAN Unit Loader,
- Navy and DLA Automated Guided Vehicle (AGV),
- DLA Consolidated Subsistence Facility (CSF),
- Navy and DLA Carousel Controllers,
- Navy and Air Force ASRS Controllers,
- Navy, Air Force and DLA Conveyors,
- DLA Allen-Bradley PLC,
- DLA Towline,
- DLA Pallet Conveyor,
- DLA Tote Conveyor,
- DLA Sorter,
- DLA Automated Weigh and Offer Systems (AWOS),
- Air Force Dimension and Weigh Systems (DAWS),
- DLA Active Item Scanner System

- DLA TRIAX Automated Storage and Retrieval System (ASRS) Controller (TRIAX) and
- communications interface with DSS (Upper Tier) functions.

1.2

System Overview

In August 1994, the Defense Distribution Systems Center (DDSC) authorized Peat Marwick (KPMG) to study the feasibility of a single equipment control system for use at all Defense Logistics Agency (DLA) depots that utilize computer-controlled mechanization. The recommendations of this study were presented in Report 3 of the KPMG study entitled "Lower Tier Standardization Evaluation". The study team proposed a portable, low-functionality system that would receive a single, Standard Movement Message (SMM) for all movement requests. DSDC proposed ECS as an equipment control system that would meet these ideals. On August 1, 1995, DDSC authorized DSDC to commence work on the development of ECS.

The purpose of ECS is to eliminate the need for the Distribution Standard System (DSS) to be involved in the mechanics of material movement at DLA depots. ECS accepts a request to move material from DSS using an SMM and will accomplish the move with no further input from DSS.

In the original version of ECS, Phase 1, the code necessary for implementation at the DLA Depots in Jacksonville, FL (DDJF), Hill AFB, UT (DDHU), Norfolk, VA (DDNV), Puget Sound, WA (DDPW), and San Diego, CA (DDDC) was developed. In Phase 2 of ECS, the code necessary for implementation at the DLA Depots in Mechanicsburg, PA (DDSP-W), and Richmond, VA (DDRV), was developed. In Phase 3, ECS, the code for implementation at the DLA Depot in New Cumberland, PA (DDSP-E) was developed. In Phase 4, ECS, the code necessary for implementation at the DLA Depots in San Joaquin Tracy, CA (DDJC-Tracy), Warner Robins, GA (DDWG), and the code for AWOS/DAWS was developed. In Phase 5, ECS, the code necessary for implementation at the DLA Depots in OCONUS Pearl Harbor, HI (DDPH), Guam (DDPH-Guam), and Yokosuka Japan (DDYJ) was developed. The expansion of the control number and conveyance ID fields from five (5) to seven (7) positions was also completed for all sites on that same baseline, and additional code for DLA Depot in San Joaquin Tracy, CA (DDJC-Tracy) was developed. Additional code is being developed to support the conveyor replacement and the Freight Terminal at Building Y-109 and W143 at DDNV. The next group of changes includes an Active Item Package Conveyor at DDSP-E, a Tote/Package Conveyor system at DDOO and a Vertical/Horizontal Tote Conveyor at DDPW. The following changes supported the replacement of the Ministackers at DDHU and a new ECS User Interface at DDNV to support the Ministacker end of aisle operation for auto and stand alone mode. The next set of changes included the Stackman AS.RS at DDDC San Diego, and the Mission/CCP Sorters at DDJC Tracy. The next changes supported the DDMA at Richmond, VA. Additional changes support the DDDE in Germersheim, Germany. Additional changes support AWOS for DDSP in New Cumberland.

1.3

Document Overview

This document describes the interface design that will serve as a basis for the DSS ECS software. Section 2 outlines referenced documents. Section 3 defines interface design. Section 4 lists any associated notes.

2.0

REFERENCED DOCUMENTS

KPMG Peat Marwick L.L.P report, subject "Lower Tier Standardization Evaluation"

Military Standard Software Development and Documentation Standards, MIL-STD-498

DSDC Project Guide for Implementing CMM Level 2, DSDC 8120.001

DSS Standards & Procedures (MSS/DS-XM0)

Borland C++ Documentation

Microsoft Developer Kit

Microsoft Windows NT Server Documentation

Microsoft SNA Server Documentation

Oracle8 Database and System Administration Guide

Advanced Windows. Jeffrey Richter. ISBN - 1-55615-677-4

Inside Windows NT: Helen Cluster. ISBN - 1-55615-481-X

Mastering Windows NT Programming. B. Myers, E. Hamer. ISBN - 0-7821-1264-1

Programming Windows. Charles Petzold. ISBN - 1-55615-395-3

Windows NT: A Developers Guide. Kevin Goodman. ISBN - 1-55851-306-X

Windows NT: Unleashed. Robert Cowart. ISBN - 0-672-30685-9

DDC Environmental Test Plan

ECS Project Management Plan, latest version

DSS INFO/MAN REFERENCE GUIDE for ENVIRONMENTAL TEST, IOC and PRODUCTION

DSS SECS Psuedocoding Standard

DSS ECS Software Development Plan (SDP), DI-IPSC-81427, archived version dated November 1, 1996

Operation Concept Description (OCD), DI-IPSC-81430, latest version

Interface Requirements Specifications (IRS), DI-IPSC-81434, archived version dated December 14, 2001

Interface Design Description (IDD), DI-IPSC-81436, latest version

Database Design Description (DBDD), DI-IPSC-81437, latest version

System/Subsystem Specification (SSS), DI-IPSC-81431, latest version

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W-143 DDNV - Defense Distribution Depot Norfolk, VA

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3.0 INTERFACE DESIGN

Each designated piece of MHE at the DLA depots must be controlled by the DSS. To that end, an interface must be developed for each type of hardware. The following paragraphs list the interface design of ECS.

3.1 Interface Identification and Diagrams

The following information lists the required interfaces and their project unique identifiers. All of these interfaces are between the ECS and the device listed in the interface title; refer to Figure 3.1-1. All protocols and formats must be verified during site surveys.

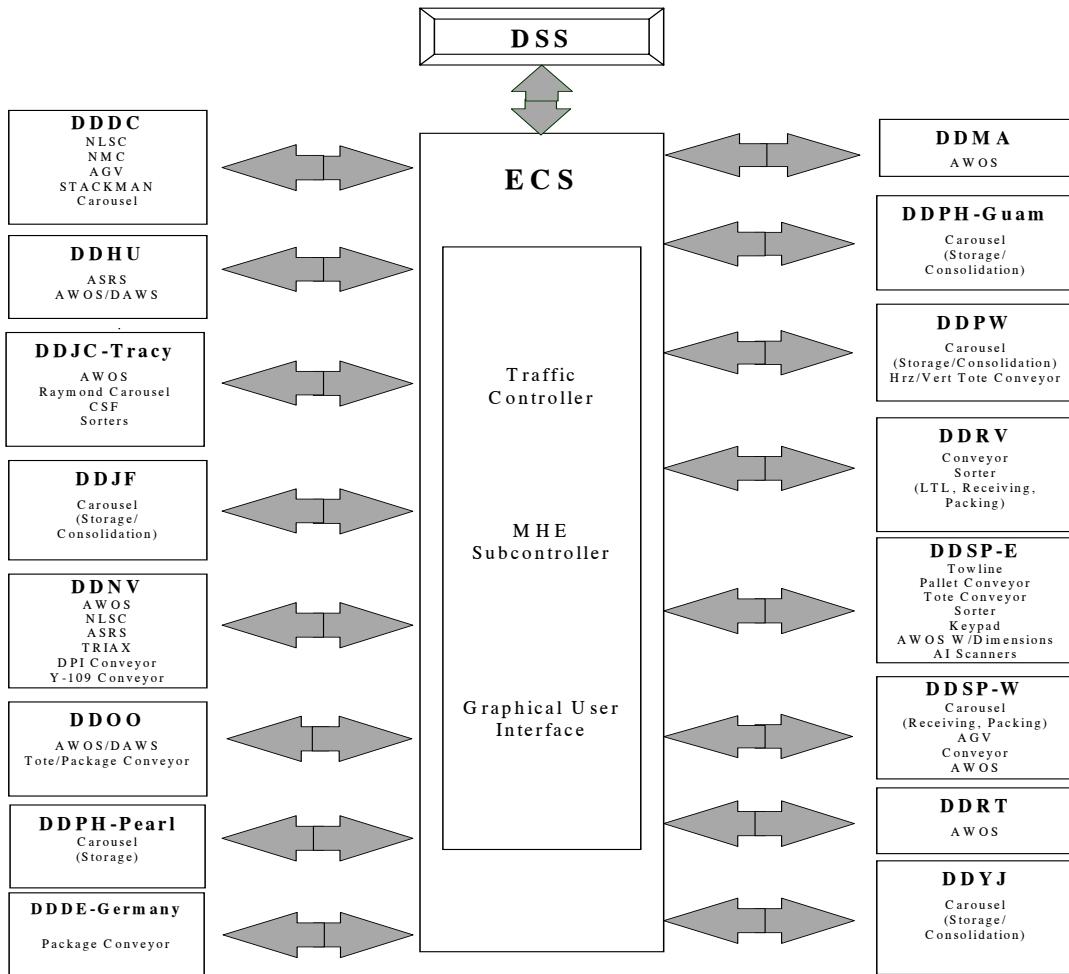


Figure 3-1 Interface Context Diagram

3.1.1 SECS-RI1.0: Upper to Lower Tier Interface

The Upper to Lower Tier Interface provides a communications conduit between the DSS mainframe processes and the ECS utilizing a Standard Movement Message (SMM).

This interface will, in general, perform one-way message transmission from the Upper Tier to the Lower Tier. No return traffic will be required. If communication is lost between the Upper and Lower Tiers, all messages will be buffered on the Upper Tier. Once communication is reestablished, the depot will access the last message received by the Lower Tier and inform the Upper Tier systems administrator of the next message sequence number. The Upper Tier systems administrator will then download all messages from that sequence number to the end of the buffer.

A variation on this interface occurs at Automatic Weighing and Offering Systems (AWOS/DAWS) where two-way message transmission exists. For AWOS/DAWS systems, ECS initiates an SMM being sent to it by sending a Standard Up Message (M02) that includes information DSS needs to provide material routing.

Communications protocol - LU6.2

3.1.1.1 Standard Movement Message (SMM) Format/Rules

Field Name	Size	Flags
Site ID	4	RCEWPDNABMFSZGT
Sequence Number	8	RCEWPDNABMFSZGT
Control Number	7	RCEWPDNABMG
Consolidation Field	15	DN
Location	16	RCEWPNT
Destination	9	RCEWPDNZABMSGT
Source	9	DNABFSPCGT
Alt. Destination	9	DNG
Second Alt. Dest.	9	DNG
Chain Structure	4	N
Conveyance	7	RCEWPDNABSM
Second Conveyance	7	DNM
Handling Unit	1	DN
Priority	1	DNT
Flag	1	RCEWPDNZABFSMGT
Option	2	F
Work Type	1	CZRFSDET
Quantity	2	D
Datetime Stamp	8	RCEWPDNZABMFSGT
Program ID	4	RCEWPDNZABMFSGT
<hr/>		
Total Size	124	

The flag field identifies type of message.

A = AGV Move	G = AWOS Move	S = Stand Status
B = Priority AGV Move	H = Empty Cart Management	T = Transfer
C = Completion	M = Module Builds	W = Clear
D = Dummy Move	N = Chain Move	Z = Workstation
E = Emergency	P = Pack Arrival	Designation
F = Fill Stand Flag	R = Request Move	

The following Work Type field entries are allowed.

C = Inventory	O = Occupied	F = Loaded Module Fill
D = Disabled	I = Inspections	E = Empty Module Fill
P = Picking	S = Stows	L = Locations Surveys

Certain SMM fields will be filled in for specific transactions. Not all fields will be filled in for each transaction. The flag column listed above identifies the transaction type for which the specific field will be entered. If the flag is not set for a field for a specific transaction, the field will be blanks. For example, a pick request transaction 'R' will require the Sequence Number, Destination, Location, Flag, and Datetime Stamp fields to be entered and all others to be blank. R, C, E, and W apply to storage activity such as, R = pick, inventory, stow, location survey or COSIS requests.

Source Field will always equal the fixed terminal ID or workstation ID originator unless the transaction is a pack arrival 'P' in which case it will contain the Pack Lane.

Destination Field will adhere to the following rules:

1. If the transaction is a rewarehouse or receipt this field will contain the 1st 9 digits of the destination location.
2. If the transaction is a pick completion 'D' this field will contain pack lane station.
3. If the transaction is a pack arrival 'P' this field will contain the consolidation carousel bin location.
4. If the transaction is a dumb move 'D' this field will be a terminal ID or preprinted barcode destination.
5. If the transaction is an ASRS request 'R' or completion 'C' this field will be a terminal ID or function ID. Function IDs are:
(P - Picking, S - Stow, L - Location Surveys, I - Inspections)
6. If the transaction is a workstation assignment this field will be the terminal ID.

3.1.1.2 **Standard Up Message (M02) Format**

Field Name	Size
Message Type	3
Control Number	7
Weight	6
Cube	4
Height	2
Length	2
Width	2
Destination	3
Source	8
Conveyance	7
Flag	1
Type	1
Option	2
Program	8
Carousel	4
Stand ID	3
Stand Status	1
Stand Enabled	1
Stand Area	1
Module ID	5
Module Status	1
Next Module Destination Area	1
Next Module Destination Stand	3
Final Module Destination Area	1
Final Module Destination Stand	3

Total Size	80

The flag field identifies type of message.

A = AWOS Lane Assignment Request

3.1.2 **SECS-RI2.0:** **Navy NLSC Interface**

The Navy NLSC Interface allows for communications between the ECS and conveyors and sortation devices controlled by the NLSC.

Communications protocol - RS-449, Serial, ASCII-7 bit, 9600 Baud,
Bisynchronous or Asynchronous

3.1.2.1 **NLSC Message Formats From ECS to NLSC.**

MESSAGE TYPE	INITIATED BY	MESSAGE DESCRIPTION	MESSAGE FORMAT
S01	User Interface	Startup	S01
S02	User Interface	Initialize	S02
S03	DSS SMM or User Interface	Scanner Destination Assignment	S03 CCCCCCCCDDDSSS CCCCCC- Control Number DDD - Destination SSS - Secondary Destination
S05	DSS SMM or User Interface	Delete Destination Assignment	S05 CCCCCCCC CCCCCC- Control Number
S08	User Interface	Verify Status	S08

Table 3.1.2.1-1 NLSC Message Formats from ECS to NLSC

3.1.2.2 **NLSC Message Formats From NLSC to ECS.**

MESSAGE TYPE	ECS ACTION	MESSAGE DESCRIPTION	MESSAGE FORMAT
S51	Transmission via CrossTalk Script to DSS Screen	Cube/Weight Data	S51 CCCCCCCC XX LLL WWW HHH BBBBBB CCCCCC- Control Number XX - Scan Head Number LLL - Length (Inches) WWW - Width (Inches) HHH - Height (Inches) BBBBBB - Weight (XXXX.XX Pounds)

MESSAGE TYPE	ECS ACTION	MESSAGE DESCRIPTION	MESSAGE FORMAT
S52	Subcontroller file update Log entry	NLSC Deletion	S52 CCCCCCCC CCCCCC - Control Number
S53	Subcontroller file update Log entry	Divert Accomplished	S53 CCCCCCCC DDD CCCCCC- Control Number DDD - Destination
S55	Subcontroller file update Log entry	Status	S55 SS III T SS - Status Code III - Equipment Id T - Type
S56	Subcontroller file update Log entry	Status Reversal	S56 SS III T SS - Status Code III - Equipment Id T - Type
S58	Log entry Alert generation	Invalid Data	S58 SS XXX...XXX SS - Source XXX...XXX - Data
S59	Log entry	NLSC ID Response	S59 P/S U P/S - Primary Secondary Flag U - Unit Number

Table 3.1.2.2-1 NLSC Message Formats from NLSC to ECS

3.1.3 **SECS-RI3.0:** **Navy NMC Interface**

The Navy NMC Interface provides a communications link between the ECS and the ASRSs controlled by the NMC.

Communications protocol - RS-232, Serial, ASCII-7 bit, 9600 Baud, Asynchronous

3.1.3.1 **NMC Message Formats From ECS to NMC**

MESSAGE TYPE	INITIATED BY	MESSAGE DESCRIPTION	MESSAGE FORMAT
M01	DSS SMM or User Interface	Workstation Assignment	M01 WS Y/N Y/N YNY WS - Workstation number 1st Y/N - Active flag 2nd Y/N - Divert flag YNY - Function flags
M02	DSS SMM or User Interface	Tray Request	M02 FFVVHHH AN P WT FF - Face VV - Vertical position HHH - Horizontal Position AN - Workstation or Function P - Priority WT - Weight
M03	User Interface	Tray Cancellation	M03 FFVVHHH AN FF - Face VV - Vertical position HHH - Horizontal Position AN - Workstation or Function (01-06, AA, BB or CC)
M04	DSS SMM or User Interface	Workstation Tray Release	M04 WS YNYYNN...Y/N WS - Workstation number YNYYNN - Function Code Bits Y/N - Tray to Workstation Indicator
M05	User Interface	NCC Restart	M05
M06	Subsystem Controller	Configuration Parameters	M06 A/B MR A/B - Primary PC MR - Mix Ratio
M09	User Interface	Initialize	M09

Table 3.1.3.1-1 NMC Message Formats from ECS to NMC

3.1.3.2 NMC Message Formats From NMC to ECS.

MESSAGE TYPE	ECS ACTION	MESSAGE DESCRIPTION	MESSAGE FORMAT
M51	Subcontroller file update Log entry	Tray Arrival At Work Position	M51 FFVVHHH FF - Face VV - Vertical position HHH - Horizontal Position
M52	Subcontroller file update Log entry Alert generation	System Restart	M52
M54	Subcontroller schedule array update	Tray Transaction Request	M54 AA-PP, 01-06 ZZZZZZ AA-PP, 01-06 - Function or Dedicated Workstation ZZZZZZ - Hexadecimal Number of Trays for Workstation or Function
M55	Subcontroller file update Log entry	Tray Arrival At Workstation Queue	M55 FFVVHHH FF - Face VV - Vertical position HHH - Horizontal Position
M57	Subcontroller file update Log entry Alert generation	Tray Request Reject	M57 FFVVHHH PX FF - Face VV - Vertical position HHH - Horizontal Position PX - Reject reason code (P1 = ASRS down, P3 = Tray relocated and ASRS down, P4 = Max entries for a dedicated workstation)

Table 3.1.3.2-1 NMC Message Formats from NMC to ECS

3.1.4 **SECS-RI4.0:** **Navy STACKMAN Interface**

3.1.4.1 **Stackman Message Formats from ECS to Stackman System Controller.**

The messages from ECS to the Stackman System Controller must be preceded by a Header and followed by a Trailer. Each message to and from the Stackman Controller has a standard message format. The complete format is described separately. Only fields that are pertinent to a particular message type are described in this section, although all fields are present in all messages.

MESSAGE TYPE	MESSAGE DESCRIPTION	MEANINGFUL MESSAGE FIELDS
50	Status Request	Command Number : 50 Equipment Number: ##
60	Retrieve From High Rise Request	Command Number : 60 Aisle : ## Bay: ### Tier: ## Workstation: ### Barcode: ##### Timestamp: #####
70	Store to High Rise Request	Command Number : 70 Aisle : ## Bay: ### Tier: ## Workstation: ### Barcode: ##### Timestamp: #####
98	Abort Command	Command Number : 98 Aisle : ## Bay: ### Tier: ## Workstation: ### Barcode: ##### Timestamp: #####

Table 3.1.4.1-1 Stackman Message Formats from ECS to Stackman System Controller

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
10	Workstation Release Request	Command Number : 10 Workstation: ### Barcode: #####
51	Equipment Status Report	Command Number : 51 Equipment Number: ## Aisle : ## Bay: ### Tier: ## Workstation: ### Barcode: ##### Status Number : ### Timestamp: #####
61	Retrieve to Workstation Complete	Command Number : 61 Equipment Number : ## Aisle : ## Bay: ### Tier: ## Workstation: ### Barcode: ##### Timestamp: #####
62	Retrieve (crane portion) Complete	Command Number : 62 Equipment Number: ## Aisle : ## Bay: ### Tier: ## Workstation: ### Barcode: ##### Status Number : ### Timestamp: #####
71	Store Complete	Command Number : 60 Aisle : ## Bay: ### Tier: ## Workstation: ### Barcode: ##### Status Number : ### Timestamp: #####

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
72	Workstation Release Complete	Command Number : 72 Aisle : ## Bay: ### Tier: ## Workstation: ### Barcode: ##### Status Number : ### Timestamp: #####

Table 3.1.4.1-2 CSF Message Formats from CSF Conveyor Controller to ECS

3.1.4.2 Stackman Equipment Numbers

Equipment Number	Equipment Description
01	Conveyor System
11	Crane 1
12	Crane 2
13	Crane 3
21	Transfer Car 1
22	Transfer Car 2
23	Transfer Car 3
99	Overall System

3.1.4.3 General Stackman Message Format

Field Name	Field Size	Position in Message
Start of Text	1	1
Command Number	2	2:3
Equipment Number	2	4:5
Aisle Number	2	6:7
Bay Number	3	8-10
Tier Number	2	11-12
Workstation	3	13-15
Barcode	5	16-20
Status	3	21-23
Timestamp	10	24-33
Stretch Wrap Indicator	1	34
Spare	1	35
End of Text	1	36
Checksum	3	37-39
Carriage Return	1	40

3.1.5 **SECS-RI5.0: Navy Carousel Interface**

The Navy Carousel Interface establishes communications between the ECS and the Navy Carousels.

Communications protocol - RS-232, Serial, ASCII-7 bit, 9600 Baud,
Asynchronous

3.1.5.1 **Navy Carousel Message Formats**

MESSAGE TYPE	INITIATED BY/ ECS ACTION	MESSAGE DESCRIPTION	MESSAGE FORMAT
G ECS-->	DSS SMM or User Interface	Goto Requested Carousel Bin	gddd ddd = Requested Bin Number
SS ECS-->	User Interface	Send Status Carousel	SS
A or M ECS<--	Subcontroller file update Log entry	Carousel Status Response	abcccdddeeefffgggh a = (A)uto or (M)anual b = Status ccc = Carousel Size ddd = Current Position 1st Workstation eee = Current Position 2nd Workstation fff = Coast Constant ggg = Number of Pulses Per Bin h = (A)sync or (P)olled
SE ECS-->	User interface	Send Carousel Errors	SE
SE Response ECS<--	Subcontroller file update Log entry	Send Carousel Errors Response	aaaaabbhhhcccccddddeeeeeffffggggg aaaaa = Power Cycles bbbb = Unacknowledged Msgs ccccc = Msg Errors ddddd = Collisions eeeeee = Invalid Commands fffff = Carousel Won't Move Errors ggggg = Positioning Errors
R ECS-->	User interface	Restart	R

Table 3.1.5.1-1 Navy Carousel Message Formats

3.1.6 **SECS-RI6.0: NO LONGER APPLICABLE.**

Sizing & Dimension Equipment was deleted at the start of ECS Phase 2.

3.1.7 SECS-RI7.0: Norfolk ASRS Interface

The Norfolk ASRS Interface provides a communications link between the ECS and the Norfolk Supreme ASRS.

Communications protocol - RS-232, Serial, ASCII-7 bit, 9600 Baud,
Asynchronous

3.1.7.1 Norfolk Supreme ASRS Message Formats from ECS to the Supreme ASRS.

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
25	Change Frequency Of Status Message Note: A message of the single character "%" will cause the CLM to slow it's status message to once every 25 seconds. Repeating the "%" will switch back to once a second.	Message Type: ## (Hex) Face No. : ## (ASCII) Note: Left side face is odd, right is even. Right and Left sides are defined by standing in front of the aisle, looking towards the rear of the aisle. Vertical Location: ## (ASCII) Horizontal Location: ###
30	Retrieve to Left	
31	Retrieve to Right	
32	Restore from Left	
33	Restore from Right	 Note: The horizontal zone is limited to 255 maximum. 1st LRC Char.: X (Binary) 2nd LRC Char.: X (Binary)
34	Submit Bin Arrival Left	
35	Submit Bin Arrival Right	
36	Request for Status	
37	Cross-Over Front	 Note: The high order 4 bits of the 1st LRC char are contained in the low 4 bits, with the high bits containing parity plus 100. The low order 4 bits of the LRC are contained in the low 4 bits, with the high bits containing parity plus 100. End of Msg "CR" : X (0D Hex)

Table 3.1.7.1-1 Norfolk Supreme ASRS Msg. Formats from ECS to the Supreme ASRS

3.1.7.2 **Norfolk Supreme ASRS Msg. Formats from the Supreme ASRS to ECS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
A	Tray Arrival for Left Side	<p>Tray Arrival: X Face No. : ## (ASCII)</p> <p>Note: Left side face is odd, right is even. Right and Left sides are defined by standing in front of the aisle, looking towards the rear of the aisle.</p> <p>Vertical Location: ## (ASCII) Horizontal Location: ###</p> <p>Note: The horizontal zone is limited to 255 maximum.</p> <p>1st LRC Char.: X (Binary) 2nd LRC Char.: X (Binary)</p> <p>Note: The high order 4 bits of the 1st LRC char are contained in the low 4 bits, with the high bits containing parity plus 100. The low order 4 bits of the LRC are contained in the low 4 bits, with the high bits containing parity plus 100.</p> <p>End of Msg "CR" : X (0D Hex)</p>
B	Tray Arrival for Right Side	
6	Status Message	<p>Message Type: # (ASCII)</p> <p>1st Status Char. : X</p> <p>Bit 0= ready to retrieve, one if true Bit 1= ready to restore, one if true Bit 2 = CPU mode=0, Manual Mode=1 Bit 3= always zero Bit 4= always one Bit 5= always one Bit 6= always zero Bit 7= parity bit</p> <p>2nd Status Char. : X</p> <p>Bit 0= bin in left, one if true</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
6	Status Message (continued)	<p>Bit 1 = bin in right, one if true Bit 2 = Busy = 0, Idle = 1 Bit 3 = always zero Bit 4 = always one Bit 5 = always one Bit 6 = always zero Bit 7 = parity bit Diagnostic Code: ## (ASCII) Blank: X (Hex 20) Blank: X (Hex 20) Blank: X (Hex 20) 1st LRC Char.: X (Binary) 2nd LRC Char.: X (Binary)</p> <p>Note: The high order 4 bits of the 1st LRC char are contained in the low 4 bits, with the high bits containing parity plus 100. The low order 4 bits of the LRC are contained in the low 4 bits, with the high bits containing parity plus 100.</p> <p>End of Msg "CR" : X (0D Hex)</p>
	Diagnostics Codes for the Status Message	<ul style="list-style-type: none"> 00 No error condition exists 01 Illegal tray address requested 02 Limit switch detected. Horizontal or vertical limit reached. 03 Limit switch will not reset. ASRS or platform has reached limit and has not gone into reverse. 05 Illegal request. Tray address unknown on restore. 07 Platform safety. Tray is improperly positioned on platform or the extraction pins are extended beyond home position. 09 Restore attempted from empty position of work station. 10 Platform extraction pins sensed in multiple positions. 12 There is a container at the lower level work station and the Local/CPU switch is in CPU mode.

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
	Diagnostics Codes for the Status Message (continued)	<ul style="list-style-type: none"> 14 Left or right is not defined on request. 15 Illegal BCD code read by horizontal or vertical read head. 16 Invalid serial data received. This code occurs when an invalid LRC code is received, garbled message, or invalid format. A new request must be transmitted. 17 Extraction attempted but no tray on platform. 18 Request tray is out of storage racks. 19 Rear door open or diagnostic panel active. 20 Extraction pins in unknown position. 21 Microprocessor has just been powered up with a load on board. This message is transmitted only once from the ASRS's microprocessor at the "power up" time. 22 Tray on side shuttle is misaligned. 26 Invalid serial request received; the request violates the last status message. Transmit a new request. 30 Restore attempted to an occupied shelf. 32 Time out error (failure to complete cycle in the prescribed time). 34 Platform attempts to come-out in other than pre-programmed level. 36 Retrieve requested while retrieve buffer is full. 43 ASRS traveling in overdrive and horizontal head data not updated within two seconds. 44 Loss of 220V power.

Table 3.1.7.2-1 Norfolk Supreme ASRS Msg. Formats from the Supreme ASRS to ECS

3.1.8 **SECS-RI8.0:** **Navy AGV Interface**

The Navy AGV Interface enables ECS to communicate with the Navy AGVs.

Communications protocol - TCP/IP

3.1.8.1 **Navy AGV Message Formats**

MESSAGE DESCRIPTION	INITIATED BY/ ECS ACTION	MESSAGE FORMAT
AGV Move ECS → AGV	NLSC/AGV Subcontroller generated	XXXX XXXX = Destination
AGV Pickup Response AGV → ECS	NLSC/AGV file update Log entry	XXXX XXXX = Destination

Table 3.1.8.1-1 Navy AGV Message Formats

3.1.9 **SECS-RI9.0:** **Air Force ASRS Interface**

The Air Force ASRS Interface provides a communications link between the ECS and the Air Force ASRS.

Communications protocol - Unipolar 20 milliAmp Direct Current Current-Loop

3.1.9.1 **Air Force ASRS Interface**

MESSAGE TYPE	INITIATED BY/ ECS ACTION	MESSAGE DESCRIPTION	MESSAGE FORMAT
D1 ECS -->	DSS SMM or User Interface	Deliver Tray	D1 L XX YY D1 = Command L = 'L' for left side 'R' for right side XX = bay number YY = tier number
A ECS -->	DSS SMM or User Interface	Alert On	A A = Command
C ECS -->	DSS SMM or User Interface	Alert Off	C C = Command
N ECS -->	User Interface	Reset	N N = Command
X ECS -->	DSS SMM or User Interface	Return Tray	X X = Command
ECS <--	Subcontroller file update Log entry Alert generation	Status	SSSS L XX YY S = Status L = 'L' for left, 'R' for right XX = bay number YY = tier number

Table 3.1.9.1-1 Air Force ASRS Message Formats

3.1.10 **SECS-RI10.0: Operator Interface**

The Operator Interface will allow the user to access ECS for the purposes of research, maintenance, backups, and logging. In addition, through the Operator Interface, users may generate Standard Movement Messages (SMMs) for local MHE control. The Operator Interface will be available at all member computers of ECS.

3.1.11 **SECS-RI11.0: Internal Interface**

The Internal Interface provides all message traffic between the ECS system components.

Communications protocol - RS-232 Serial ASCII-7 bit 9600-Baud Asynchronous or 10BASET network

The ECS utilizes two distinct sets of internal messages. One set of internal messages between the Traffic Controller and the User Interface is generic. The second set is restricted to a particular subcontroller and is Material Handling Equipment (MHE) dependent.

3.1.11.1 **ECS Internal Message Standard Format**

All ECS Internal Messages will be of the following format.

Field	Length	Data Type
Address-To	5	Alphanumeric
Address-From	5	Alphanumeric
Message Length	3	Numeric
Internal Message	Structure	
Internal Message ID	Structure	
Message Type Code	1	Alphanumeric
Message Number	2	Alphanumeric
Internal Message Body	varies	Alphanumeric

Table 3.1.11.1-1 Internal Message Standard Format

3.1.11.2 **Address-To/Address-From Values**

Each Address-To/Address-From field is a 5 character alphanumeric field which is comprised of a three character identifier, followed by a two character numeric value (i.e., 01,02,...99) indicating the Subcontroller number.

Address-To/Address-From	ECS Subcontroller
ACTxx	Active Item Controller
ABPxx	Allen-Bradley Controller
AGVxx	Automatic Guided Vehicles (AGV)
AWSxx	Automated Way Offering Controller (AWOS)
CARxx	Carousel
CSFxx	Consolidated Subsistence Facility (CSF)
FLSxx	Air Force Laser Scanner Subsystem
FRTxx	Freight Terminal Subsystem
HPMxx	Hewlett Packard Controller
KEYxx	Keypad Interface Controller
NLSxx	NISTARS Laser Scanner Controller
NMCxx	NISTARS Ministacker Controller
NVTxx	Norfolk Virginia Tote Controller
PALxx	Pallet Conveyor Controller
PCSxx	Package Conveyor System
PSCxx	Puget Sound Conveyor Subsystem
RAYxx	Raymond Carousel Controller
SMNxx	STACKMAN Controller
SRTxx	Sorter Controller
STKxx / NFSxx / HKSxx / HKUxx	Stacker
SUBxx	All Subcontrollers
TOTxx	Tote Conveyor Controller
TOWxx	Towline Controller
TRXxx	TRIAx Controller
TRFxx	Traffic Controller
UPSxx	Uninterrupted Power Supply Controller
USExx	User Interface

Table 3.1.11.2-1 Address-To/Address-From Values

3.1.11.3 Message Length Values

The Message Length is the sum of the lengths of the Message Type Code, the Message Number, and the Message Body. The Message Length is a minimum of three (3) characters when there is no Internal Message Body.

3.1.11.4 Message Type Code Values

The Message Type Code is a one character alphanumeric field containing one of the following values.

Message Type Code	Definition
A	User Request for Action (URA)
J	User Request for Information (URI)

K	User Information Response (UIR)
M	User Request for Movement (URM)
N	User Movement Response (UMR)
T	User/Keypad Request (UKR)
U	Subcontroller Update (SU)
V	User AS/RS Request (URS)
W	User Request for Movement (URM)
X	User AS/RS Reply (USR)
Z	Alert (ALR)

Table 3.1.11.4-1 Message Type Code Values

3.1.11.5 ECS Generic Internal Messages

The following is a list of the generic internal messages and their corresponding Internal Message Body layouts. The generic internal message identifier consists of a one character Message Type Code followed by a two character Message Number in the range of 01 to 99. Odd numbered messages originate from either the Traffic Controller or the User Subcontroller. Even numbered messages originate from all other ECS Subcontrollers.

The entries under the column heading labeled "Direction" indicate the direction of travel of the messages between the Address-To/Address-From ECS controllers.

DISTRIBUTION STANDARD SYSTEM

Equipment Control System

September 8, 2004

Message Details						
ID	Length	Name	Direction	Body Fields	Size	Data Type
M02	80	Standard Up Message	USE->TRF	Message Type	3	Alpha
				Control Number	7	Alpha
				Weight	6	Numeric
				Cube	4	Numeric
				Height	2	Numeric
				Length	2	Numeric
				Width	2	Numeric
				Destination	3	Alpha
				Source	8	Alpha
				Conveyance ID	7	Alpha
				Flag	1	Alpha
				Type	1	Alpha
				Option	2	Alpha
				Program	8	Alpha
				Carousel	4	Alpha
				Stand ID	3	Alpha
				Stand Status	1	Alpha
				Stand Enabled	1	Alpha
				Stand Area	1	Alpha
				Module ID	5	Alpha
				Module Status	1	Alpha
				Next Module	1	Alpha
				Destination Area		
				Next Module	3	Alpha
				Destination		
				Stand		
				Final Module	1	Alpha
				Destination Area		
				Final Module	3	Alpha
				Destination		
				Stand		
J01	3	Status Request	USE-->SUB	None	0	N/A
K02	26	Status Response	USE<--SUB	Status Text	23	Alpha
N02	33	Arrival/ Completion	USE<--SUB	Control Number	7	Alpha
				Location	16	Alpha
				Destination	9	Alpha
Z04	131	Alert Warning	USE<--SUB	Alert Text	128	Alpha
Z02	15	Subcontroller Alert Warning	USE<--SUB	Alert Warning	2	Alpha
				Alert Text	10	Alpha

Table 3.1.11.5-1 ECS Generic Internal Messages

3.1.11.6 ECS Restricted Internal Messages

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The following is a list of the restricted internal messages and their corresponding Internal Message Body layouts. The restricted internal message identifier consists of a one character Message Type Code followed by a two character Message Number in the range of 01 to 99. Odd numbered messages originate from either the Traffic Controller or the User Subcontroller. Even numbered messages originate from all other ECS subcontrollers.

The entries under the column heading labeled "Direction" indicate the direction of travel of the messages between the Address-To/Address-From ECS controllers.

Message ID	Length	Name	Direction	Body Fields	Size	Data Type
A21	3	NLSC Initialize Device	USE->NLSC	None	0	N/A
A41	11	NMC Workstation Assignment	USE-->NMC	Workstation Work Flags	2 6	Alpha Alpha
A44	21	NMC Tray Reject Reason	USE<--NMC	Location Reject Reas. Code	16 2	Alpha Alpha
J31	5	CAR Errors Request	USE-->CAR/RAY	Device	2	Alpha
J33	5	CAR Status Request	USE-->CAR/RAY	Device	2	Alpha
J41	12	NMC At Workstation Request	USE-->NMC	Source	9	Alpha
J51	7	HPM Location Inquiry	USE-->HPM	Carousel Location	4	Alpha
J53	8	HPM Tote Inquiry	USE-->HPM	Tote Number	5	Alpha
J55	8	HPM Tote In Traffic Inquiry	USE-->HPM	Tote Number	5	Alpha
J61	6	AGV Status Inquiry	USE-->AGV	AGV ID	3	Alpha
J63	6	Stand Status Inquiry	USE-->AGV	Stand Number	3	Alpha
J71		This had been used by a Tote Message, however this message is no longer being used.				
J73	168	TOT Update Conveyor Lane Status	USE-->TOT	Wkst ID Change Indicator	[4 1] # of lanes (35)	Alpha Alpha
J75	11	TOT Update Conveyor Inspection Lane Type	USE-->TOT	Wkst ID Type	4 4	Alpha Alpha
J77	11	TOW Release From Intradepot Receiving Queue	USE-->TOW	Control Number Output Lane	7 1	Alpha

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Message ID	Length	Name	Direction	Body Fields	Size	Data Type
J79	7	TOW Release From M/H Pack Queue	USE-->TOW	Cart ID	4	
J81	10	TOW Update Cart Type	USE-->TOW	Cart ID Cart Type	5 2	
J83	7	TOW Unlock Workstation (by Spur ID)	USE-->TOW	Spur ID	4	
J85	8	TOW Update M/H Queue Priority	USE-->TOW	Spur ID Priority	4 1	
J87	9	TOW Update Drop Point Warehouse	USE-->TOW	Spur ID Warehouse ID	4 2	
J91	9	TOW Unlock Towline Workstation (by chain ID)	USE-->TOW	Zone ID Chain ID	2 4	Alpha Alpha
J93	13	TOW Cart Arrival -or- TOW Cart At Workstation	USE-->TOW	Cart ID Spur ID Flag	5 4 1	Alpha Alpha Alpha
J95	47	TOW Fault Handling M/H Update Queue	USE-->TOW	Wkst Id Cart Ids	4 8[5]	Alpha Alpha
J97	33	TOW Fault Handling M/H Pack Lane Counts	USE-->TOW	Wkst Id Old Count Enroute Old Count New Count Enroute New Count Unlock	1 1 1 1 1 1	Alpha Alpha Alpha Alpha Alpha Alpha
J99	11	TOW Update Towline Inspection Spur Type	USE->TOW	Wkst ID Type	4 4	Alpha Alpha
K24	14	NLSC Deletion Verification	USE<-NLSC	Control Number Elapsed Time	7 4	Alpha Numeric
K32	38	CAR Errors Response	USE<--CAR	Errors	35	Alpha
K34	21	CAR Status Response	USE<--CAR	Status	18	Alpha
K42	10	NMC At Workstation Response	USE<--NMC	NMC Tray ID	7	Alpha

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Message ID	Length	Name	Direction	Body Fields	Size	Data Type
K52	14	HPM Location Inquiry Response	USE<--HPM	Carousel Number Segment Tier P/R Indicator Tote Number E/O Indicator	1 2 1 1 5 1	Alpha Alpha Alpha Alpha Alpha Alpha
K54	13	HPM Tote Inquiry Response	USE<--HPM	Tote Number Carousel Location P/R Indicator	5 4 1	Alpha Alpha Alpha
K56	14	HPM Tote In Traffic Inquiry Response	USE<--HPM	Tote Number Route Stand No. Destination	5 3 3	Alpha Alpha Alpha
K62	11	HKS Fault Response	USE<--HKS	Filler Filler Filler	3 1 4	Alpha Alpha Alpha
K64	11	Stand Inquiry Response	USE<--AGV	Stand Number Status Transaction ID	3 1 4	Alpha Alpha Alpha
T01	12	KEY Queue Empty Request	KEY->TOW	Keypad ID Dest Type	3 4 2	Alpha Alpha Alpha
T03	16	KEY Queue Empty Cart	KEY->TOW	Keypad ID Dest Type Cart	3 4 2 4	Alpha Alpha Alpha Alpha
T05	14	KEY Display Cart Routing	KEY->TOW	Keypad ID Source Dest	3 4 4	Alpha Alpha Alpha
T07	7	Fault Handling Request PLC Zone Destination File Upload	USE->TOW	Zone ID Upload Type	2 2	Alpha Alpha
T11	10	Fault Handling Request Cart Status	USE->TOW	Zone ID Cart ID	2 5	Alpha Alpha
T13	9	Fault Handling Request PLC File Reset	USE->TOW	Zone ID Reset Code	2 4	Alpha Alpha
T15	3	Request Sorter Chute Totals	USE->SRT	None	N/A	N/A
T17	7	Wakeup M/H Queue Manager	PAL->TOW	Wkst ID	4	Alpha

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Message ID	Length	Name	Direction	Body Fields	Size	Data Type
T23	14	Move Pallet Message	TOW->PAL	Ctrl Num Wkst Id	7 4	Alpha Alpha
T25	8	TOW Update Spur Status	USE->TOW	Wkst Id Change Indicator	4 1	Alpha Alpha
T27	67	Fault Handling - Intradepot Queues	USE->TOW	Wkst Id Cart Ids	4 12[5]	Alpha Alpha
T29	8	Modify Damaged Tote Status	USE->TOT	Tote Id	5	Alpha
T30	4	Start or Stop Control Panel Message	USE->AWS	Start/Stop Code ('1', '0')	1	Alpha
T34	3	Request Device Statistics	USE->AWS	None	N/A	N/A
T36	3	Reset Device Statistics	USE->AWS	None	N/A	N/A
T38	9	Update Tote Default Weight	USE->AWS	Tote Weight	6	Alpha
T40	10	Update Reject Lane Message	USE->AWS	Divert Old Lane ID New Lane ID	1 3 3	Alpha Alpha Alpha
T42	5	Start or Stop Station Queue Screen	USE->AWS	Station Number Start or Stop State	1 1	Alpha Alpha
T44	4	Clear Queue	USE->AWS	Station Number	1	Alpha
T46	8	Hand Scan Message	USE->AWS	Control Number Station Number	7 1	Alpha Alpha
T48	20	Tote Package System Divert	AWS->TPK	Scanner ID ("06" or "07") Destination Control Number	2 8 7	Alpha Alpha Alpha
T50	3	Clear 10Lbs Lanes Buffer Message	USE->AWS	None	N/A	N/A
T52	8	Update 10Lbs Lanes Message	USE->	Divert Lane ID State	1 3 1	Alpha Alpha Alpha
U06	46	KEY Return Cart Routing	SUB->TOW	Keypad ID Dest	3 4 (10)	Alpha Alpha
U08	2405	Fault Handling Response PLC Zone Destination File Upload	USE->TOW	Response Type Cart Destination	2 2400	Alpha Byte

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Message ID	Length	Name	Direction	Body Fields	Size	Data Type
U10	1240 bytes	Fault Handling Response PLC Loop Tracking File Upload	USE-<-TOW	Response Type [Cart ID Destination] * Max Cart Number	2 4 4 4	Alpha Alpha Alpha Alpha
U12	16	Fault Handling Response Cart Status	USE-<-TOW	Cart ID Destination Chain ID Chain Length Recirculation Count	4 4 3 1 1	Alpha Alpha Alpha Alpha Alpha
U16	4	Confirm Sorter Chute Totals	USE-<-SRT	Status of Update	1	Alpha
U31	28	Control Panel Message	AWS->USE	Device ID Message Text	5 20	Alpha Alpha
U33	4	AWOS Start or Stop Confirmation	AWS->USE	Start/Stop Code ('1', '0')	1	Alpha
U35	272	Device Statistics Reply Message	AWS->USE	Reset Time Device Components	14 15 [17]	Alpha Alpha
U43	111	Queue Change Notification	AWS->USE	Queue Number Queue Size Control Number Array	1 2 15 [7]	Alpha Alpha Alpha
U45	5	Station Queue Authorization	AWS->USE	Station Number State	1 1	Alpha Alpha
V01	4	CSF Conveyor Change Status	USE->CSF	Status	1	Alpha
V03	9	CSF Conveyor Change Status	USE->CSF	S/RM Number Status Flag Mode Flag	4 1 4	Alpha Alpha Alpha
V05	8	Discrete Transaction Emulation	USE->CSF	Stand State	4 1	Alpha Alpha
V07	19	Request to Send Tracking Move	USE->CSF	Load ID From Stand To Stand	8 4 4	Alpha Alpha Alpha
V09	19	Move Complete Emulation	USE->CSF	Load ID From Stand To Stand	8 4 4	Alpha Alpha Alpha
V11	11	Clear Load ID from PLC	USE->CSF	Load ID	8	Alpha

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Message ID	Length	Name	Direction	Body Fields	Size	Data Type
V13	27	Edit Station Status	USE->CSF	Workstation Terminal ID Loads Enroute Load ID Station Activity	4 8 3 8 1	Alpha Alpha Numeric Alpha Alpha
V15	18	Manual Stacker Control	USE->CSF	Command Type Aisle From Location To Location	1 2 6 6	Alpha Numeric Alpha Alpha
V17	4	Enter/Exit Tracking Screen	USE->CSF	Enter/Exit Code ('1' or '0')	1	Alpha
V19	6	Request Tracking Read	USE->CSF	Area	3	Alpha
V21	4	Enable/Disable Area	USE->CSF	Area Action('E' or 'D')	3 1	Alpha Alpha
V23	9	Delete Load From Zone	USE->CSF	Area Zone	3 3	Alpha Alpha
V25	20	Add Load To Zone	USE->CSF	Area Zone Load Dest	3 3 8 3	Alpha Alpha Alpha Alpha
V27	12	Change Load Destination	USE->CSF	Area Zone Dest	3 3 3	Alpha Alpha Alpha
V29	12	Relocate Load	USE->CSF	Area Source Zone Destination Zone	3 3 3	Alpha Alpha Alpha
W01	11	Source/Destination Routing Message	USE-->TOW	Spur From Spur To	4 4	Alpha Alpha
W02	43	Current Routing Message	USE<--TOW	Message Text	40	Alpha
W03	4	Transfer Selection Message	USE-->TOW	Message Text	1	Alpha
W04	44	Available Loop/Transfers Message	USE<--TOW	Status Flag Mssage Text	1 40	Alpha
W05	4	Routing Acceptance Message	USE-->TOW	Status Flag	1	Alpha
X20	4	Tracking Read Response	CSF->USE	Area Success/Failure Flag ('S'/'F')	3 1	Alpha Alpha
X30	8	Load Change Response	CSF->USE	Area Change Success/Flag	3 1 1	Alpha Alpha Alpha

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Message ID	Length	Name	Direction	Body Fields	Size	Data Type
Z22	37	NLSC Errors	USE<-NLSC	Error Text	34	Alpha

Table 3.1.11.6-1 ECS Restricted Internal Messages

3.1.12 **SECS-RI12.0: Richmond Allen-Bradley PLC 5/20 Interface**

The Interface allows for communications between the ECS and conveyors, carousels, and sortation devices controlled by the Allen-Bradley PLC.

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, and no parity, 9600-Baud Asynchronous

3.1.12.1 **Allen-Bradley PLC Message Formats from ECS to Allen-Bradley PLC.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
P01	LTL Packing Pallet Movement - Single Pallet	<p>P01__PPPPSSSSDDDX _____PPP-Pallet No. (2 spaces and 4 position pallet no.)</p> <p>SSS - Source DDD - Destination X - Filler</p> <p>valid destinations are: PKG - Packing PRK - Pallet Rack CNS - Consolidation OFR - Offer</p>
P05	LTL Packing Pallet Movement - Multi (2)	<p>P05__PPPP__PPPPSSSSDDDX PPPP-Pallet No. (2 spaces and 4 position pallet no.) PPPP-Pallet No. 2 (2 spaces and 4 position pallet no.)</p> <p>SSS - Source DDD - Destination X - Filler</p> <p>valid destinations are: PKG - Packing PRK - Pallet Rack CNS - Consolidation OFR - Offer</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
R04	Receiving Tote Movement - Single	<p>R04_TTTTSSSSDDDX _TTTT-Tote No. (1 space and 5 positions tote no.)</p> <p>SSS - Source DDD - Destination X - Filler</p> <p>valid destinations are: MDL - Module Load PPP - PPP&M Assessment PPM - PPP&M RQI - Random Quality Inspector PKS - Pack Station PDO - Property Disposal Station ESI - Electronic Sensitive Items MLN - Multi Line 411 Through 455</p>
R06	Receiving Tote Movement - Multi (up to 8)	<p>R06_TTTT..._TTTTSSSSDDDX (TTTT occurs 8 times) TTTT - Tote No. 1 (1 space and 5 positions tote no.) TTTT - Tote No. 8 (1 space and 5 positions tote no.)</p> <p>SSS - Source DDD - Destination X - Filler</p> <p>valid destinations are: MDL - Module Load PPP - PPP&M Assessment PPM - PPP&M RQI - Random Quality Inspector PKS - Pack Station PDO - Property Disposal Station ESI - Electronic Sensitive Items MLN - Multi Line 411 Through 455</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
P01	Bin Packing Movement	P01BBBBBBB_SSSDDDL BBBBBBB - Bar Code (7 position bar code and 1 null) SSS - Source DDD - Destination L - Light/Heavy Cd. (Light = 0, Heavy = 1, Single Chute = Space)
SPN	LTL Packing - Spin Carousel	SPNNLLSSS N - Carousel No. (1-7) LL - Carousel Location SSS - Source Workstation

Table 3.1.12.1-1 Allen-Bradley PLC Message Formats from ECS to Allen-Bradley PLC

3.1.12.2 Allen-Bradley PLC Message Formats from Allen-Bradley PLC to ECS.

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
P06	Bar Code From Scanner	P06BBBBBBB BBBBBBB - Bar Code (7 position left justified and 1 null)

Table 3.1.12.2-1 Allen-Bradley PLC Message Formats from Allen-Bradley PLC to ECS

3.1.13 SECS-RI13.0: Mechanicsburg HP 1000 Receiving and Packing Interface

The Interface allows for communications between the ECS and conveyors controlled by the HP 1000 Receiving and Packing Controllers.

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, no parity, 9600-Baud Asynchronous

3.1.13.1 HP 1000 Message Formats from ECS to HP 1000 Receiving and Packing Controllers.

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
I01	Location Inquiry	I01NSSTLength 7 N - Carousel No. SS - Segment T - Tier
I03	Tote Inquiry	I03OOOOOLength 8 OOOOO - Tote No.
I05	Tote In Traffic Inquiry	I05OOOOOLength 8 OOOOO - Tote No.
P01	Tote Routing	P01OOOOOSSSSDDDDLength 14 OOOOO - Tote No. SSS - Source DDD - Destination valid destinations are - 001 through 765
P03	Tote Release	P03OOOOONSSTDDDDLength 15 OOOOO - Tote No. N - Carousel No. SS - Segment T - Tier DDD - Destination valid destinations are - 001 through 765
P05	Empty Tote Notification	P05OOOOO Length 8 OOOOO - Tote No.

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
R03	Tote Release	R03OOOOONSSTDDLength 15 OOOOO - Tote No. N - Carousel No. SS - Segment T - Tier DDD - Destination valid destinations are - 001 through 765
R04	Tote Routing	R04OOOOOSSSSDDLength 14 OOOOO - Tote No. SSS - Source DDD - Destination valid destinations are - 001 through 765
R05	Tote Release (Multi)	R05OOOOONSST...OOOOONSSTDDLength 96 Source #1 OOOOO - Tote No. N - Carousel No. SS - Segment T - Tier Source #10 DDD - Destination valid destinations are - 001 through 765

Table 3.1.13.1-1 HP 1000 Message Formats from ECS to HP 1000 Receiving & Packing

3.1.13.2 **HP 1000 Message Formats From HP 1000 Receiving & Packing Controllers to ECS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
I02	Location Inquiry Response	I02NSSTPOOOOOELength 14 N - Carousel No. SS - Segment T - Tier P - P / R Indicator OOOOO - Tote No. E - E / O Indicator

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
I04	Tote Inquiry Response	I04OOOOOCCCCPLength 13 OOOOO - Tote No. CCCC - Carousel Location P - P / R Indicator
I06	Tote In Traffic Inquiry Response	I06OOOOORRRDDDDLength 14 OOOOO - Tote No. RRR - Route DDD - Destination valid destinations are - 001 through 765
P02	Tote Stow Confirmation	P02OOOOONSSTLength 12 OOOOO - Tote No. N - Carousel No. SS - Segment T - Tier
P04	Workstation Arrival	P04OOOOOWWWLength 11 OOOOO - Tote No. WWW - Workstation ID
R01	Tote Stow Confirmation	R01OOOOONSSTLength 12 OOOOO - Tote No. N - Carousel No. SS - Segment T - Tier

Table 3.1.13.2-1 HP 1000 Message Formats From HP 1000 Receiving & Packing Controllers to ECS

3.1.14 **SECS-RI14.0: Mechanicsburg LAC (Local Area Controller) Interface**

The Interface allows for communications between the ECS and the AGV LAC Controller.

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, no parity, 9600-Baud Asynchronous

3.1.14.1 **LAC Message Formats from ECS to AGV LAC Controller.**

The messages from ECS to the AGV LAC Controller must be preceded by three Qs and followed by three Zs. The format will look like: QQQmessageZZZ

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
H01	Pickup/Delivery Transaction Purpose: The Pickup/Delivery Transaction is the message that allows ECS to supply transactions to the AGVs.	Transaction Code:H01 Transaction ID:#### Pickup Area: x Pickup Stand No.: ### Delivery Area: x Delivery Stand No.: ### Module/Pallet Sel.: x (M or P) Priority Cd.: x (Y or N)
H02	Reroute Transaction Purpose: The Reroute Transaction is the message that allows ECS to change the Delivery Stand No. of a Pickup/ Delivery Transaction that has already been sent.	Transaction Code:H02 Transaction ID:#### Delivery Stand No.: ### AGV No.: ###
H03	AGV Inquiry Transaction Purpose: The AGV Inquiry Transaction allows ECS to inquire about the current state of a specific AGV.	Transaction Code:H03 Transaction ID:#### AGV No.: ###

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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
H04	<p>Stand Inquiry Transaction</p> <p>Purpose: The Stand Inquiry Transaction allows ECS to inquire about the state of one or two specific stands.</p>	<p>Transaction Code:H04</p> <p>Transaction ID:####</p> <p>Stand No. 1:###</p> <p>Stand No. 2:###</p> <p>If the status of a single stand is desired, the Stand No. 2 field should contain all zeroes (0)</p>
H05	<p>Resume Communications Request</p> <p>Purpose: The Resume Communications Request is a message that ECS should send out when communications to the LAC have been lost or not yet established.</p>	Transaction Code:H05
H06	<p>End of Transmission Flag</p> <p>Purpose: The End of Transmission Flag message is sent after each of the other outgoing ECS messages. This message signals the LAC that ECS is done transmitting and that the LAC may send its message(s).</p>	Transaction Code:H06
H07	<p>Power Failure Acknowledgement</p> <p>Purpose: The Power Failure Acknowledgement message is sent after ECS receives a Power Failure Detected message (message L99, sub code 20). This message lets the LAC know that ECS is aware of the power failure and that a loss of ECS/LAC communication is expected shortly.</p>	Transaction Code:H07

Table 3.1.14.1-1 LAC Message Formats from ECS to AGV LAC Controller

3.1.14.2 LAC Message Formats from AGV LAC Controller to ECS

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
L01	AGV Return to Service Purpose: The AGV Return to Service message informs ECS that the specified AGV is operational and capable of receiving transactions.	Transaction Code:L01 AGV No.: ###
L02	AGV Out of Service Purpose: The AGV Out of Service message informs ECS that the specified AGV is going out of service for a specified reason.	Transaction Code:L02 AGV No.: ### Destination: x B - Going to Battery M - Going to Maintenance O - Off Wire, Under User Control
L03	AGV Inquiry Response Purpose: The AGV Inquiry Response is the mate to ECS AGV Inquiry Transaction.	Transaction Code:L03 Transaction ID:#### AGV No.: ### AGV Status: x R - Requires Manual Assistance A - Active M - Going to/at Maintenance B - Going to/at Battery O - Off Wire, Under User Control
L04	Stand Inquiry Response Purpose: The Stand Inquiry Response is the mate to ECS Stand Inquiry Transaction.	Transaction Code:L04 Transaction ID:#### Stand No. 1:### Stand No. 1 Status: x Stand No. 2:### Stand No. 2 Status: x E - Empty O - Occupied X - Out of Order If the status of a single stand is desired, the Stand No. 2 field should contain all zeroes (0).

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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
L05	Pickup/Delivery Confirmation Purpose: The Pickup/Delivery Confirmation message is sent to ECS once when the pickup portion of a specific transaction is completed and confirmed, and a second time when the delivery portion of that transaction is completed and confirmed.	Transaction Code:L05 Transaction ID:#### Stand No. 1:###
L06	End of Queued Transactions Flag Purpose: In the event of loss of ECS/LAC communications and after receiving ECS Resume Communications message, the LAC will send all of the messages that it has saved since communications was lost and then send the End of Queued Transactions Flag message.	Transaction Code:L06
L98	Acknowledgement Message Purpose: The Acknowledgement Message is sent to ECS when the LAC has none of the other types of messages to send. This message lets ECS know that its message was received.	Transaction Code:L98
L99	Error Transaction Purpose: The Error Transaction informs ECS of specific errors which have been detected throughout the AGVs.	Transaction Code:L99 Transaction ID:#### Status Cd.: ## AGV No/Status Subcd: ### Location Last Tag Read: #### Distance LTR:#### Current Frequency: #

Table 3.1.14.2-1 LAC Message Formats from AGV LAC Controller to ECS

3.1.15 **SECS-RI15.0: New Cumberland Towline Interface**

The New Cumberland Towline Interface provides a communications link between ECS and the New Cumberland Towline Controller.

Communications protocol - RS - 232 Serial ASCII-8 bit 9600-Baud
Asynchronous with one stop bit.

3.1.15.1 **New Cumberland Towline Message Formats from ECS to Towline PLC.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
03	Cart Destination Purpose: This message is sent to indicate to the PLC that a cart is to be moved from one location to another.	Message Type : 03 Length: 18 Cart ID : ##### Destination : ##### Release Location (source) : ##### Chain ID : ### Chain Length : #
06	Towline System Controller Status and Upload Command Purpose: This message is sent whenever ECS starts up or shuts down or when an upload is requested.	Message Type : 06 Length: 6 Status Command (Start/Stop) : ## Upload Request : ## Valid Contents of the Status Field: 0 - status update 1 - shutdown 2 - startup Valid Contents of the Upload Request: 07 - upload destination file 10 - upload first loop tracking file 11 - upload second loop tracking file 0 - no upload
09	Abort Chain Purpose: This message is sent when, under certain conditions, a chain of carts must be dissolved. This message uses the chain ID to abort this chain.	Message Type: 09 Length: 7 Chain ID : ##### Chain Length: #
12	Request Cart Information Purpose: This message requests the destination, recirculation count, chain ID, and chain length of a particular cart.	Message Type : 12 Length: 6 Cart ID : #####

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
14	<p>Unlock Workstation</p> <p>Purpose: This message is sent when a workstation has been reserved for a chain of carts, but not all carts have arrived. This message uses the workstation ID to dissolve the chain and release the reserved workstation.</p>	<p>Message Type : 14 Length:6</p> <p>Spur Number : #####</p>
15	<p>Configure Spur Type</p> <p>Purpose: This message is sent to notify the PLC that a spur is being added to a given inspection work area.</p>	<p>Message Type : 15 Length:10</p> <p>Spur ID : #####</p> <p>Spur Type : #####</p>

Table 3.1.15.1-1 New Cumberland Message Formats from ECS to Towline PLC.

3.1.15.2 **New Cumberland Towline Message Formats from Towline PLC to ECS.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
01	<p>Cart Arrival</p> <p>Purpose: This message tells ECS that a cart has arrived at a towline spur or transfer.</p>	<p>Message Type : 01 Length: 10</p> <p>Cart ID : #####</p> <p>Location : #####</p>
02	<p>Missed Divert</p> <p>Purpose: This error message indicates that a cart has not arrived at its destination correctly. The cart has passed its destination spur or transfer, a cart doesn't unload at an automatic unloader, or a loaded cart has arrived at a loading station.</p>	<p>Message Type : 02 Length: 10</p> <p>Cart ID : #####</p> <p>Location : #####</p> <p>Valid Location Fields include either a spur number, loader ID, or unloader ID.</p>
04	<p>Cart at Workstation</p> <p>Purpose: This message identifies the location of a cart. It has either been successfully unloaded by an automatic unloader, it has arrived at a loading station, or it has arrived at a station with a scale or sizing equipment.</p>	<p>Message Type : 04 Length: 10</p> <p>Cart ID : #####</p> <p>Location : #####</p> <p>Valid Location Fields include either a spur number, loader ID, or unloader ID.</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
05	Transfer/Loop Status Purpose: This message is sent when a loop status, spur status, or transfer status changes (up or down).	Message Type : 05 Length: 32 Status bit map : 15 16 bit words in length This status may pertain to a loop, spur, or transfer.
07	Cart Destination File Upload Purpose: This message contains the contents of the cart destination file.	Message Type : 07 Length: 2402 Cart Destinations : (2400 bytes for character destinations)
08	Towline Zone Mode Status Purpose: This message is sent when a towline PLC zone status changes.	Message Type : 08 Length: 4 PLC Zone Number : # Status : # Valid status modes for a zone include: 1 - automatic 2 - semi-automatic 3 - manual 4 - start-up acknowledge 5 - shut-down acknowledge
10	First Loop Tracking File Upload Purpose: This message contains the contents of a loop-tracking file.	Message Type : 10 Length: Variable Tracking File Contents: Length of contents varies depending on the loop.
11	Second Loop Tracking File Upload Purpose: This message contains the contents of a loop-tracking file.	Message Type : 11 Length: Variable Tracking File Contents: Length of contents varies depending on the loop.
13	Cart Information Request Reply Purpose: This message is sent in response to the Request Cart Information message from ECS.	Message Type : 13 Length: 15 Cart ID : ##### Destination : ##### Chain ID : ### Chain Length :# Recirculation Count : #

Table 3.1.15.2-1 New Cumberland Message Formats from Towline PLC to ECS.

3.1.16 **SECS-RI16.0: New Cumberland Pallet Conveyor Interface**

The New Cumberland Conveyor Interface allows for communications between the ECS and the New Cumberland Pallet Conveyor Controller.

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, no parity, 9600-Baud Asynchronous

3.1.16.1 **New Cumberland Message Formats from ECS to Pallet Conveyor PLC.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
08	<p>Conveyor Sub Controller Status (Startup/Shutdown)</p> <p>Purpose: This message is sent whenever the ECS starts up or shuts down. It is also sent when a zone that has been operating in semi-automatic mode is returned to automatic mode.</p>	<p>Message Type: 08 Length: 5</p> <p>PLC Zone Number: ##</p> <p>Status Command (Start/Stop): #</p> <p>Valid status commands:</p> <p>1-Startup</p> <p>2-Stop</p>
12	<p>New Pallet Move</p> <p>Purpose: This message is sent when a pallet load is placed on the conveyor and needs to be moved to a destination. It identifies the load and destination to the PLC.</p>	<p>Message Type: 12 Length: 13</p> <p>Destination: ###</p> <p>Load ID (Control Number): #####</p> <p>Source: ###</p>

Table 3.1.16.1-1 New Cumberland Message Formats from ECS to Pallet Conveyor PLC.

3.1.16.2 **New Cumberland Message Formats from Pallet Conveyor PLC to ECS.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
09	Conveyor PLC Zone Status Purpose: This message is sent when a conveyor PLC zone status changes.	Message Type: 09 Length: 5 PLC Zone Number: ## Status: # Valid modes include: 1-Automatic 2-Semi-Automatic 3-Manual 4-Start-Up Acknowledge 5-Shut-Down Acknowledge
11	Load Present Purpose: This message informs the ECS that a pallet load is present at induction or exit positions on the pallet conveyor.	Message Type: 11 Length: 5 Location (Station ID): ###
13	Pallet Arrival Purpose: This message informs the ECS that a pallet load has arrived at the designated conveyor or lane.	Message Type: 13 Length: 10 Location (Destination): ### Load ID (Control Number): #####
14	Transporter Status Purpose: This message is sent when the status changes for spurs V092-V095.	Message Type: 14 Length: 3 Conveyor Map (Bit Map): #

Table 3.1.16.2-1 New Cumberland Message Formats from Pallet Conveyor PLC to ECS.

3.1.17 **SECS-RI17.0: New Cumberland Tote Conveyor Interface**

The New Cumberland Conveyor Interface allows for communications between the ECS and the New Cumberland Tote Conveyor Controller.

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, no parity, 9600-Baud Asynchronous

3.1.17.1 **New Cumberland Message Formats from ECS to Tote Conveyor PLC.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
01	<p>New Tote Move</p> <p>Purpose: This message informs the PLC that a tote is to be moved to a new destination.</p>	<p>Message Type: 01 Length: 14</p> <p>Chain ID: ###</p> <p>Chain Length: #</p> <p>Destination: ###</p> <p>Tote ID: #####</p>
04	<p>Station Enable/Disable</p> <p>Purpose: This message informs the PLC that a workstation is disabled and that no loads are to be sent to that conveyor lane.</p>	<p>Message Type: 04 Length: 5</p> <p>PLC Zone Number: ##</p> <p>Station ID: #</p> <p>(Bit map to identify conveyor lane)</p>
07	<p>Set Workstation Type</p> <p>Purpose: This message sets the inspection workstations for a certain type of inspection. This allows the workstation function to be changed based on workload requirements.</p>	<p>Message Type: 07 Length: 6</p> <p>Random Stations (Bit Map): #</p> <p>Retrograde Stations (Bit Map): #</p> <p>New Procurement Stations (Bit Map):#</p> <p>Depot Property Stations (Bit Map): #</p>
08	<p>CSC Status (Startup/Shutdown)</p> <p>Purpose: This message is sent whenever the ECS starts up or shuts down. It is also sent when a zone that has been operating in semi-automatic mode is returned to automatic mode.</p>	<p>Message Type: 08 Length: 5</p> <p>PLC Zone Number: ##</p> <p>Status Command (Start/Stop): #</p> <p>Valid status commands:</p> <p>1-Startup</p> <p>2-Shutdown</p>

Table 3.1.17.1-1 New Cumberland Message Formats from ECS to Tote Conveyor PLC.

3.1.17.2 **New Cumberland Message Formats from Tote Conveyor to ECS.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
09	Conveyor PLC Zone Status Purpose: This message is sent when a conveyor PLC zone status changes.	Message Type: 09 Length: 5 PLC Zone Number: ## Status: # Valid modes include: 1-Automatic 2-Semi-Automatic 3-Manual 4-Start-Up Acknowledge 5-Shut-Down Acknowledge

Table 3.1.17.2-1 New Cumberland Message Formats from Tote Conveyor PLC to ECS.

3.1.18 **SECS-RI18.0: New Cumberland Sorter Interface**

The New Cumberland Sorter Interface provides a communications link between ECS and New Cumberland Sorters.

Communications protocol - RS- 232 Serial ASCII-8 bit 9600-Baud Asynchronous with 2-byte checksum and one stop bit.

3.1.18.1 **New Cumberland Message Formats from ECS to Sorter.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
01	Chute Destination Purpose: This message sends the barcode ID and chute destination.	Message Type : 01 Length: 13 EDCCN : ##### Chute ID : ####
04	Status Message	Message Type : 04 Length: 3 Sorter Status : # Valid values for sorter status include: 4 - Startup Enable 5 - Shutdown Request
06	Product File Table Download Complete Purpose: This message indicates that there are no more data records to be downloaded from the product file table.	Message Type : 06 Length: 2
07	Status Inquiry Purpose: This message requests the current mode of sorter operation.	Message Type : 07 Length: 2

Table 3.1.18.1-1 New Cumberland Message Formats from ECS to Sorter.

3.1.18.2 **New Cumberland Message Formats from Sorter to ECS.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
02	Table Full Purpose: This message informs ECS that the destination database is full.	Message Type: 02 Length:2
03	Package Dumped Purpose: This message tells ECS which chute a particular item has been sent down.	Message Type: 03 Length: 18 EDCCN:##### Chute ID: ##### Status (Final Destination) : # Time : ####
05	Product File Table Purged Purpose: This message tells ECS that the purge product file table option has been selected.	Message Type: 05 Length: 2
08	Sorter Status Purpose: This message responds to a status inquiry by ECS.	Message Type: 08 Length: 3 Sorter mode: # Valid Sorter modes include: 0 - Automatic 1 - Semi Automatic 2 - Manual 3 - Maintenance 4 - Startup completed 5 - Shutdown complete

Table 3.1.18.2-1 New Cumberland Message Formats from Sorter to ECS

3.1.19 **SECS-RI19.0: Norfolk V52 Interface**

The Norfolk V52 Interface allows for communications between the ECS and the Norfolk Crane Controller.

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, no parity, 9600-Baud Asynchronous

3.1.19.1 **Norfolk Message Formats from ECS to V52 PLC.**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT																											
RBC	Retrieve By Carrier	<p>Message Type: RBC Length: 43</p> <p>XLLLLLZZZZTTTTTRBC_CCCCCCCCCSSSS SSSSSSPPY</p> <table> <tr><td>X</td><td>-</td><td>Start of Text</td></tr> <tr><td>L</td><td>-</td><td>Message Length</td></tr> <tr><td>z</td><td>-</td><td>Check Sum</td></tr> <tr><td>T</td><td>-</td><td>Transaction Number</td></tr> <tr><td>RBC</td><td>-</td><td>Message Type</td></tr> <tr><td>C</td><td>-</td><td>Carrier ID</td></tr> <tr><td>S</td><td>-</td><td>Station ID</td></tr> <tr><td>P</td><td>-</td><td>Priority</td></tr> <tr><td>Y</td><td>-</td><td>End of Text</td></tr> </table>	X	-	Start of Text	L	-	Message Length	z	-	Check Sum	T	-	Transaction Number	RBC	-	Message Type	C	-	Carrier ID	S	-	Station ID	P	-	Priority	Y	-	End of Text
X	-	Start of Text																											
L	-	Message Length																											
z	-	Check Sum																											
T	-	Transaction Number																											
RBC	-	Message Type																											
C	-	Carrier ID																											
S	-	Station ID																											
P	-	Priority																											
Y	-	End of Text																											

Table 3.1.19.1-1 Norfolk Message Formats from ECS to V52 PLC.

3.1.19.2 Norfolk Message Formats from V52 to ECS.

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
RTCP	Retrieve By Carrier Complete	<p>Message Type: RTCP Length: 41</p> <p>XLLLZZZZTTTTRTCPCCCCCCCCSSSSY</p> <p>X - Start of Text L - Message Length z - Check Sum T - Transaction Number RTCP - Message Type C - Carrier ID S - Station ID Y - End of Text</p>
STCP	Store Complete	<p>Message Type: STCP Length: 41</p> <p>XLLLZZZZTTTSTCPCCCCCCCCCCCCCCCSSSSSSSSSY</p> <p>X - Start of Text L - Message Length z - Check Sum T - Transaction Number STCP - Message Type C - Carrier ID S - Station ID Y - End of Text</p>
ARBC	Abort Retrieve by Carrier	<p>Message Type: STCP Length: 62</p> <p>XLLLZZZZTTTARBCCCCCCCCSSSSSSSSSSPPRRRRRRRRRRRRRRRY</p> <p>X - Start of Text L - Message Length z - Check Sum T - Transaction Number ARBC - Message Type C - Carrier ID S - Station ID P - Priority R - Abort Reason Y - End of Text</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
CRN	Crane Status	<p>Message Type: CRN Length: 27</p> <p>XLLLZZZZTTTCCRNIIDDD</p> <p>X - Start of Text L - Message Length z - Check Sum T - Transaction Number CRN_ - Message Type I - Crane ID D - Status ("IN", "OUT")</p>
ACK	Acknowledgement	<p>Message Type: ACK Length: 21</p> <p>XLLLZZZZTTTACK_Y</p> <p>X - Start of Text L - Message Length z - Check Sum T - Transaction Number ACK_ - Message Type Y - End of Text</p>
NAK	Negative Acknowledgement	<p>Message Type: NAK Length: 21</p> <p>XLLLZZZZTTTNAK_EE</p> <p>X - Start of Text L - Message Length z - Check Sum T - Transaction Number ACK_ - Message Type E - Reason Code ("000", "001", "002", "010", "011", "012", "013", "024", "025")</p>

Table 3.1.19.2-1 Norfolk Message Formats from V52 PLC to ECS.

3.1.20 **SECS-RI20.0: Mechanicsburg AWOS Interface**

The Interface allows for communications between the ECS and the PLC's, control number scanners, tote scanners, and scales.

3.1.20.1 **Mechanicsburg Message Formats from ECS/AWOS to PLC**

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, no parity, 9600-Baud Asynchronous

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	PLC Destination Message	PLC address: ##### Length:10 PLC number: ## Destination: ##

Table 3.1.20.1-1 Mechanicsburg Message Formats from ECS/AWOS to PLC

3.1.20.2 **Mechanicsburg Message Formats from PLC to ECS/AWOS**

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, no parity, 9600-Baud Asynchronous

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	Line Full Status Bitmap (this applies to bldg. 209 AWOS and IMC 1 AWOS only)	Total Lanes (integer):# Length.variable Lane Status Bitmap: 1 character per lane.

Table 3.1.20.2-1 Mechanicsburg Message Formats from PLC to ECS/AWOS

3.1.20.3 **Mechanicsburg Other Message Formats**

Communications protocol - RS-232 Serial ASCII-7 bit data, 2 stop bit, even parity, 9600-Baud Asynchronous

MESSAGE SENDER	MESSAGE DESCRIPTION	MESSAGE FORMAT
Control Number Scanner	Control Number Scan	Control Number: ##### Length:8 Read Status: #
Scale	Weight Information	Weight In Whole Pounds:### Length:8 Decimal Point: . Fractional Weight: ## Unit Indicator: LB

Table 3.1.20.3-1 Mechanicsburg Other Message Formats

The Interface allows for communications between the ECS and the PLC's, control number scanners, tote scanners, and scales.

3.1.21 **SECS-RI21.0: New Cumberland AWOS Interface**

The Interface allows for communications between the ECS and PLC's, control number scanners and scales.

3.1.21.1 **New Cumberland Message Formats from ECS/AWOS to PLC**

Communications protocol - RS- 232 Serial ASCII-7 bit 9600-Baud Asynchronous with no parity and 2 stop bits.

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	PLC Destination Message	Destination: ## Length:2

Table 3.1.21.1-1 New Cumberland Message Formats from ECS/AWOS to PLC

3.1.21.2 **New Cumberland Other Message Formats**

Communications protocol - RS- 232 Serial ASCII-7 bit 9600-Baud Asynchronous even parity and 1 stop bits.

MESSAGE SENDER	MESSAGE DESCRIPTION	MESSAGE FORMAT
Control Number Scanner	Control Number Scan	Control Number: ##### Length:8 Read Status: #
Scale	Weight Information	Weight In Whole Pounds:### Length:8 Decimal Point: . Fractional Weight: ## Unit Indicator: LB

Table 3.1.21.2-1 New Cumberland Other Message Formats

3.1.22 **SECS-RI22.0: Norfolk AWOS Rules of Communications**

Communications Specification, Baud Rate - 9600, Byte Size - 7, Parity - even, Stop Bits - 1 stop bit, Null Stripping - disabled, Binary Mode - set.

3.1.22.1 **Message Formats (Host to PLC)**

3.1.22.1.1 **New ECS Proposed ECS To PLC Message**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
01	Lane assignment	<p>Message Type: 01 Length: 5</p> <p>Lane Number: ##</p> <p>Divert Number : #</p> <p>The Divert Number would be the position of a set of lanes (either at the first, second, or third divert) represented by (1, 2, or 3) respectively</p>

Table 3.1.22.1.1-1 New ECS Proposed ECS To PLC message

Note: Lane IDs will be physical lane ID. No groups will be used. Divert Number refers to the scanner with which lanes associated. In this instance (Norfolk) there are only two scanners. Up to three are allowed for potential use at other sites.

3.1.22.2 **Norfolk Other Message Formats**

MESSAGE SENDER	MESSAGE DESCRIPTION	MESSAGE FORMAT
Scanner	Control Number Scan	<p>Control Number: #####</p> <p>A special value is: 0000000 = No Barcode could be read</p>
Scale	Weight Information	<p>Weight in whole pounds: ####</p> <p>Decimal Point: .</p> <p>Fractional Weight: ##</p>

Table 3.1.22.2-1 Norfolk Other Message Formats

3.1.23 **SECS-RI23.0: Oklahoma City AWOS Rules of Communications**

Communications Specification, Baud Rate - 9600, Byte Size- 8, Parity - even, Stop Bits - 1 stop bit.

3.1.23.1 **Message Formats (Host to Fairbanks)**

3.1.23.1.1 **ECS To Fairbanks Messages**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A ("=#")	Restart Conveyor	Message Type: n/a Length: 2 Message Body "=#"
N/A ("=@")	Ready for Next Transaction	Message Type: n/a Length:2 Message Body "=@"

Table 3.1.23.1.1-1 ECS To Fairbanks Messages

3.1.23.1.2 **Fairbanks to ECS Message**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	Dimension and Weight Message	Message Type: n/a Length:11 Package Length: ## Package Width: ## Package Height: ## Package Weight:##### Note: For the weight field there is an implied decimal point between the third and fourth characters.

Table 3.1.23.1.2-1 Fairbanks to ECS Message

3.1.23.2 **Oklahoma City Other Message Formats**

MESSAGE SENDER	MESSAGE DESCRIPTION	MESSAGE FORMAT
Hand Scanner	Control Number Scan	Control Number: ##### a special value is: ????? = No Barcode could be read

Table 3.1.23.2-1 Oklahoma City Other Message Formats

3.1.24 **SECS-RI24.0:** **Tracy AWOS Interface**

3.1.24.1 **Tracy Message Formats from ECS/AWOS to PLC**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
01	Start/Stop AWOS 1	Message Type: 01 Length:14 Command Code: # Message Padding: 000000000 Valid Command Codes include: 0 - Stop 1 - Start
02	Start/Stop AWOS 2	Message Type: 02 Length:14 Command Code: # Message Padding: 000000000 Valid Command Codes include: 0 - Stop 1 - Start
03	Send Lane Destination 1 (for Offer Lane)	Message Type: 03 Length: 14 Command Code: 0 Control Number: ##### Assignment 1: ## Assignment 2: ##
04	Send Lane Destination 2 (for Freight Lane)	Message Type: 04 Length: 14 Command Code: 0 Control Number: ##### Assignment 1: ## Assignment 2: ##
08	Are You Alive Message	Message Type: 08 Length: 14 Message Padding: 999999999

Table 3.1.24.1-1 Tracy Message Formats from ECS/AWOS to PLC

3.1.24.2 **Tracy Message Formats from PLC to ECS/AWOS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
06	Request For Lane Destination 1	Message Type: 06 Length: 14 Command Code: 0 Control Number: ##### Message Filler: 0000
07	Request For Lane Destination 2	Message Type: 07 Length: 14 Command Code: 0 Control Number: ##### Message Padding: 0000
08	Are You Alive Message	Message Type: 08 Length: 14 Message Padding: 999999999999
11	Change Awos1 Scan Mode	Message Type: 11 Length: 14 Command Code: # Message Padding: 000000000 Valid Command Codes include: 0 = No Scanner 1 = Overhead Scanner 2 = Handheld Scanner
12	Change Awos2 Scan Mode	Message Type: 12 Length: 14 Command Code: # Message Padding: 000000000000 Valid Command Codes include: 0 = No Scanner 1 = Overhead Scanner 2 = Handheld Scanner

3.1.24.3 Table 3.1.24.2-1 Tracy Message Formats from PLC to ECS/AWOS
Tracy Other Message Formats

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MESSAGE SENDER	MESSAGE DESCRIPTION	MESSAGE FORMAT
Scanner	Control Number Scan	Control Number: ##### a special value is: ??????? = misread
Scale	Weight Information	Weight in whole pounds:#### Decimal pt: . Fractional weight: #

Table 3.1.24.3-1 Tracy Other Message Formats

3.1.25 **SECS-RI25.0:** **Air Force Laser Scanner Controller Interface**

No Longer Applicable.

3.1.26 **SECS-RI26.0: Tracy CSF (Consolidated Subsistence Facility) PLC Interface**

The Interface allows for communications between the ECS and the CSF PLC Controllers

Communications protocol - RS-232 Serial ASCII-8 bit data, 1 stop bit, no parity, 9600-Baud Asynchronous

3.1.26.1 **CSF Message Formats from ECS to CSF ASRS Controllers.**

The messages from ECS to the CSF ASRS Controllers must be preceded by a Linefeed Preamble and followed by a two digit Check Sum and a Carriage Return Postamble. The format will look like: LFmessageCSCR

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
KL	Kill Command Purpose: The Kill Command clears existing commands from the ASRS registers.	Transaction Code:KL ASRS Number ### Command Type KL Transaction ID:####
QR	Query Command Purpose: The Query Command asks the PLC for the status of a transaction. This message is used only for testing.	Transaction Code:QR ASRS Number ### Command Type QR Transaction ID:####
MV	Move Command Purpose: The Move Command moves ASRS from its current location to another location without picking up or depositing a load.	Transaction Code:MV ASRS Number ### Command Type MV Transaction ID:#### Load Type ## Source P&D Number ## Source Bay Number ### Source Level Number ## Source Side # Destination P&D Number ## Destination Bay Number ### Destination Level Number ## Destination Side #

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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
PK	Pickup Command Purpose: The Pickup Command requests that ASRS pickup a load from storage location or pickup stand.	Transaction Code:PK ASRS Number ### Command Type PK Transaction ID:#### Load Type ## Source P&D Number ## Source Bay Number ### Source Level Number ## Source Side # Destination P&D Number ## Destination Bay Number ### Destination Level Number ## Destination Side #
DP	Deposit Command Purpose: The Deposit Command deposits a load that is already on ASRS onto a storage location or destination stand.	Transaction Code:DP ASRS Number ### Command Type DP Transaction ID:#### Load Type ## Source P&D Number ## Source Bay Number ### Source Level Number ## Source Side # Destination P&D Number ## Destination Bay Number ### Destination Level Number ## Destination Side #
PD	Transfer Command (Pickup and Deposit) Purpose: The Transfer Command picks up a load from a pickup stand or storage location, places it on ASRS, moves it to its destination location, and deposits the load onto a storage location or destination stand.	Transaction Code:PD ASRS Number ### Command Type PD Transaction ID:#### Load Type ## Source P&D Number ## Source Bay Number ### Source Level Number ## Source Side # Destination P&D Number ## Destination Bay Number ### Destination Level Number ## Destination Side #

Table 3.1.26.1-1 Tracy Message Formats from ECS to ASRS/PLC

3.1.26.2 **CSF Message Formats from CSF ASRS Controllers to ECS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
SR	<p>ASRS Response Message</p> <p>Purpose: The ASRS Response Message is the all-purpose response to any ASRS movement request. The ASRS responds when a transaction has begun, when the transaction ends, and when a fault has occurred.</p>	<p>Transaction Code:SR</p> <p>ASRS Number ###</p> <p>Command Type SR</p> <p>Transaction ID:####</p> <p>S/RM Busy x (0 = false, 1 = true)</p> <p>Command Done x (0 = false, 1 = true)</p> <p>Kill Done x (0 = false, 1 = true)</p> <p>Half Cycle Done x (0 = false, 1 = true)</p> <p>Auto Mode x (0 = false, 1 = true)</p> <p>Manual Mode x (0 = false, 1 = true)</p> <p>Reserved ###</p> <p>Carriage Home x (0 = false, 1 = true)</p> <p>EDM Warmed x (0 = false, 1 = true)</p> <p>Pending Empty x (0 = false, 1 = true)</p> <p>Battery Low x (0 = false, 1 = true)</p> <p>Shuttle Centered x (0 = false, 1 = true)</p> <p>Load Present x (0 = false, 1 = true)</p> <p>Fault x (0 = false, 1 = true)</p> <p>Fault Number ####</p> <p>Current Bay Position ###</p> <p>Current Hoist Position ##</p> <p>Sequencer Step ##</p> <p>Aisle Travel Time ###</p> <p>Hoist Travel Time ###</p> <p>Shuttle Extend Time ###</p> <p>Hoist w/Sht Extend Time ###</p> <p>Shuttle Center Time ###</p> <p>Pending Idle Time ###</p>

Table 3.1.26.2-1 CSF Message Formats from CSF ASRS Controller to ECS
3.1.26.3 **CSF Message Formats from ECS to CSF Conveyor Controller.**

The messages from ECS to the CSF Conveyor Controller must be preceded by a Linefeed Preamble and followed by a two digit Check Sum and a Carriage Return Postamble. The format will look like: LFmessageCSCR

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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
TM	<p>Tracking Move Message</p> <p>Purpose: The Tracking Move Message directs the conveyor PLC to induct a load onto the conveyor from a specified source zone and deliver it to a specified destination zone.</p>	<p>Transaction Code:TM</p> <p>Conveyor PLC Number 001</p> <p>Command Type TM</p> <p>Transaction ID:####</p> <p>Current Zone Number ###</p> <p>Destination Zone Number ###</p> <p>Load ID #####</p>
TR	<p>Tracking Read Request Message</p> <p>Purpose: The Tracking Read Request Message directs the conveyor PLC to respond with tracking information for all zones within the specified conveyor area.</p>	<p>Transaction Code:TR</p> <p>Conveyor PLC Number 001</p> <p>Command Type TR</p> <p>Transaction ID:####</p> <p>Conveyor Area ###</p>
TU	<p>Tracking Update Message</p> <p>Purpose: The Tracking Update Message directs the conveyor PLC to update the internal tracking information with that specified</p>	<p>Transaction Code:TU</p> <p>Conveyor PLC Number 001</p> <p>Command Type TU</p> <p>Transaction ID:####</p> <p>Current Zone ###</p> <p>Destination Zone ###</p> <p>Load ID #####</p>
SU	<p>Status Update Message</p> <p>Purpose: The Status Update Message directs the conveyor PLC to update conveyor status (IMT-inhibit material movement, AMT-allow material movement). S/RM aisle status is part of this message but is always enabled.</p>	<p>Transaction Code:SU</p> <p>Conveyor PLC Number 001</p> <p>Command Type SU</p> <p>Transaction ID:####</p> <p>Conveyor Status ###</p> <p>Aisle Status #####</p>
SS	<p>Section Start/Stop Message</p> <p>Purpose: The Section Start/Stop Message directs the conveyor PLC to enable or disable a specified section of the conveyor.</p>	<p>Transaction Code:SS</p> <p>Conveyor PLC Number 001</p> <p>Command Type SS</p> <p>Transaction ID:####</p> <p>Conveyor Area ###</p> <p>Section Status (E)nable or (D)isable</p>

Table 3.1.26.3-1 CSF Message Formats from ECS to CSF Conveyor Controller
 3.1.26.4 **CSF Message Formats from CSF Conveyor Controller to ECS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
TA	<p>Tracking Arrival Message</p> <p>Purpose: The Tracking Arrival Message. is transmitted to the host system upon the arrival of a load at its intended or final destination.</p>	<p>Transaction Code:TA</p> <p>Conveyor PLC Number 001</p> <p>Command Type TA</p> <p>Transaction ID:####</p> <p>Arrival Zone ###</p> <p>Destination Zone ###</p> <p>Load ID #####</p>
DT	<p>Discrete Transition Message</p> <p>Purpose: The Discrete Transition Message returns the state or transition of a discrete (usually a photo cell) to the host system. A “high” state indicates a load present, and a “low” indicates a load clear.</p>	<p>Transaction Code:DT</p> <p>Conveyor PLC Number 001</p> <p>Command Type DT</p> <p>Transaction ID:####</p> <p>Current Zone ###</p> <p>Discrete Transition (0 = Low; 1 - High)</p>
TS	<p>Tracking Status Message</p> <p>Purpose: The Tracking Status Message returns tracking information (load destinations and IDs) for a requested conveyor area and the status of that area (enabled or disabled). Up to a total of four (4) tracking zones of information can be returned in each message. Successive messages are sent for subsequent zones in the area.</p>	<p>Transaction Code:TS</p> <p>Conveyor PLC Number 001</p> <p>Command Type TS</p> <p>Transaction ID:####</p> <p>Conveyor Area Status #</p> <p>Current Zone ###</p> <p>Destination Zone ###</p> <p>Load ID #####</p> <p>Current Zone ###</p> <p>Destination Zone ###</p> <p>Load ID #####</p> <p>Current Zone ###</p> <p>Destination Zone ###</p> <p>Load ID #####</p> <p>Current Zone ###</p> <p>Destination Zone ###</p> <p>Load ID #####</p>

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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
SZ	Sizing Message Purpose: The Sizing Message informs the host system that a load has been rejected and indicates the reason for the failure.	Transaction Code:SZ Conveyor PLC Number 001 Command Type SZ Transaction ID:#### Current Zone ### Load ID ##### Reject Status ##### 1=fail;0=OK Byte 1 = Over Weight Byte 2 = Over Height Byte 3 = Oversize Left Side Byte 4 = Oversize Right Side Byte 5 = Oversize Front Byte 6 = Oversize Rear Byte 7 = Failed Bar Code Scan Byte 8 = Load Size A Byte 9 = Load Size B
FA	Fault Message Purpose: The Fault Message informs the host system that a faulted condition has been detected in a conveyor zone. The zone number and fault type are indicated.	Transaction Code:FA Conveyor PLC Number 001 Command Type FA Transaction ID:#### Current Zone ### Fault Code ###
ST	Status Message Purpose: The Status Message informed the host system of the general status of the conveyor system as in the conveyor status, aisle status, and the verification counter value. The ST message is sent upon initial start-up of the conveyor PLC and whenever the Host changes the status with a status update (SU) message.	Transaction Code:ST Conveyor PLC Number 001 Command Type ST Transaction ID:#### Conveyor Status ### (AMT, IMT) Aisle Status ##### 0 = Out of Service; 1 = In Service

Table 3.1.26.4-1 CSF Message Formats from CSF Conveyor Controller to ECS

3.1.27 **SECS-RI27.0: Tracy Raymond Carousel Interface**

The Tracy Carousel Interface establishes communications between the ECS/Host and the Tracy Raymond Carousels.

Communications protocol - RS-232 Serial ASCII-7 bit 9600-Baud Asynchronous

3.1.27.1 **Tracy Host to Carousel Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
Header *1	Beginning of message. Controller identification and redundant identification are selected by the user and depend on the configuration of the carousel.	1 EOT 2 Controller Identification (0-9, A-F) 3 Redundant Identification (0-9, A-F) 4 s 5 STX
Footer *2	End of message. Message identification is selected by the user. This character can be used in a long series of commands to verify visually, using a monitor that the commands are sent.	1 Message Identification (0-9, A-Z) 2 ETX 3 CR
C	Clear Pending work is purged. Returned to FIFO state.	1-5 Header *1 6 Command Type - C 7-10 Four Zeroes (0000) 11-13 Footer *2
g	Goto1 Requested Carousel Bin Carousel is sent to the bin number specified.	1-5 Header *1 6 Command Type - g 7 Zero (0) 8-10 Three Digit Bin Number (000-999) 11-13 Footer *2
h	Home Smallest numbered bin is brought to the present offset position.	1-5 Header *1 6 Command Type - h 7-10 Four Zeroes(0000) 11-13 Footer *2

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
p	Poll 1 This command causes the controller to send out Status for Axis #1.	1 EOT 2 Controller Id (0-9,A-F) 3 Redundant Id (0-9,A-F) 4 Command Type (p) 5 ENQ
q	Poll 2 This command causes the controller to send out Status for Axis #2.	1 EOT 2 Controller Id (0-9,A-F) 3 Redundant Id (0-9,A-F) 4 Command Type (q) 5 ENQ
r	Poll 3 This command causes the controller to send out Status for Axis #3.	1 EOT 2 Controller Id (0-9,A-F) 3 Redundant Id (0-9,A-F) 4 Command Type (r) 5 ENQ
t	Poll 4 This command causes the controller to send out Status for Axis #4.	1. EOT 2. Controller Id (0-9,A-F) 3. Redundant Id (0-9,A-F) 4. Command Type (t) 5. ENQ
R	Reset Clears all error conditions and resets status bits.	1-5 Header *1 6 Command Type - R 7-10 Four Zeroes (0000) 11-13 Footer *2
S	Stop Unconditionally stops carousel. Will reset bit 1 of the 2 nd status word. To resume processing, a reset command must be sent to the controller.	1-5 Header *1 6 Command Type - S 7-10 Four Zeroes (0000) 11-13 Footer *2

Table 3.1.27.1-1 Tracy Host to Carousel Message Formats

3.1.27.2 **Tracy Carousel to Host Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
ACK	Response sent to the host when message received properly. (Valid)	DLE ACK CR
NAK	Response sent to the host when message received improperly. (Invalid)	DLE NAK CR
	Status response to POLL1 command type p.	1 STX 2 Controller Id (0-9,A-F) 3 Redundant Id (0-9,A-F) 4-6 Three Status Words 7-9 Three Digit Bin Number (000-999) 10 Message Id (0-9,A-F) 11 ETX
	Status response to POLL2 command type q.	1 STX 2 Controller Id (0-9,A-F) 3 Redundant Id (0-9,A-F) 4-6 Three Status Words 7-9 Three Digit Bin Number (000-999) 10 Message Id (0-9,A-F) 11 ETX
	Status response to POLL3 command type r.	1 TX 2 Controller Id (0-9,A-F) 3 Redundant Id (0-9,A-F) 4-6 Three Status Words 7-9 Three Digit Bin Number (000-999) 10 Message Id (0-9,A-F) 11 ETX
	Serial Response to Poll4. The controller's serial number is sent to the computer.	1 EOT 2. Controller Id (0-9,A-F) 3. Redundant Id (0-9,A-F) 4. STX 5-7 Three Digit Serial Number MSD(000-999) 8-10.Three Zeroes (000) 11 Message Id (0-9,A-F) 12 ETX 13 CR

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
	1 st Status Word Binary	0 Data Error (1) - Incorrect bin number, axis not on-line. 1 Command Error (1) - Controller busy, axis busy, axis position unknown, bpi is not on-line. 2 Last Command Overflowed File (1) -File queue cannot exceed 99 pending file transactions 3 Transmission Error (1) 4 Controller Failure (1) - Failed self diagnostics 5 Run mode (1)/Program mode (0) 6 1 (Always)
	2 nd Status Word Binary	0 External Control (1) - Controller is set to respond to inputs from an external source through its communication ports. 1 Received Stop Command (1) - Received stop command from host, portable hand controller stop button depressed, detected any fatal conditions. 2 Move completed successfully (1) - the carousel is in position. 3 Axis Busy (1) - Acting on command. 4 Home Failure (1) - Failed to detect the home sensor within the active window zone. The active window zone is confined to the absolute reference point and has a width of +/- 1024 encoder pulses. 5 Encoder Failure (1) - Cannot detect encoder-pulse feedback upon motion command, detected a loss of encoder-pulse feedback during motion, direction sense error. 6 1 (Always)

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
	3 rd Status Word Binary	0 Controller Busy (1) - Processing request 1 Axis On-line (1) - Axis turned on. 2 Positioning error (1) - Carousel overshot destination and is outside of allowable positioning tolerance. The active acceptable positioning window has a width of +/- 256 encoder pulses. 3 Position Unknown (1) - All positioning data lost due to power outage, controller reset from reset button on back of portable hand controller, raised in conjunction with bit 4 of the 2 nd status word above. 4 Go button depressed (1) - Raised when the go button located on the remote go switch has been depressed. 5 BPI Utility Busy (1) - Processing request. 6 1 (Always)

Table 3.1.27.2-1 Tracy Carousel to Host Message Formats

3.1.28 **SECS-RI28.0:** **DDNV Triax Interface**

The DDNV Triax Interface establishes communications between the Host and the DDNV Triax AS/RS. The DDNV Triax consists of a Conveyor PLC and four Crane PLCs.

Communications protocol - RS-232 Serial ASCII-8 Bit 1 Stop Bit No Parity
9600-Baud Asynchronous

The messages follow the general format:

- Header of length 1 character, indicated by a Start of Text;
- Message Body of length 17 characters;
- Footer of length 5 characters which include an End of Text character, 3 digits of checksum, and is concluded by a Carriage Return character.

Both the Host and the PLCs will validate messages in the following manner:

The checksum and the message length will be calculated.

The receiver echoes the message.

If the message passes all communication tests, the echoed message will contain '00' in the status field.

If the checksum calculation fails, the echoed message will contain '61' in the status field.

If the message length fails, the echoed message will contain '62' in the status field.

If the crane receives an invalid crane ID, the echoed message will contain a '63' in the status field.

No other field in the echoed message will be altered when a 60 series error code is exchanged.

The messages are all of fixed total length 23.

Any unused field is zero filled.

The checksum number will be the sum total of all the decimal values of the ASCII characters between STX and ETX, including STX and ETX. If the checksum is greater than 3 digits, eliminate the most significant digit. The checksum number is then converted into ASCII.

Example 1: Message to be sent from Host to Crane 1. Perform Pick from storage location at segment 31 and level 11.

STX / 60 / 001 / 1 / 00 / 031 / 11 / 0000 / ETX

ASCII string: STX = 02; ETX = 03; 0 = 48; 1=49; 3 = 51; 6 = 58 the ASCII string becomes
02,58,48,48,48,49,49,48,48,48,48,48,49,49,49,48,48,48,48,03

Add all decimal values:

$02+58+48+48+48+49+49+48+48+48+51+49+49+49+48+48+48+48+03 = 839$

Convert 839 to ASCII: 8 = 56, 3 = 51, 9 = 57 checksum becomes 56,51,57

Add checksum to end of string and add CR (13 decimal) to complete message.

Final message is:

02,53,52,48,48,49,49,48,48,48,51,49,49,49,48,48,48,48,03,56,51,57,13

Example 2: Message from Crane 4 to Host. Completed Drop at Drop station.

STX / 61 / 004 / 1 / 00 / 999 / 99 / 0000 / ETX

ASCII string becomes

02,54,49,48,48,52,49,48,48,57,57,57,57,48,48,48,48,03

Add all decimal values:

$02+54+49+48+48+52+49+48+48+57+57+57+57+57+48+48+48+48+03 = 878$

Convert 878 to ASCII: 56,55,56

Add Checksum to end of string and add CR (13 decimal) to complete message.

Final message is:

02,54,49,48,48,52,49,48,48,57,57,57,57,48,48,48,48,03,56,55,56,13

3.1.28.1 DDNV Host to Triax Conveyor PLC Message Formats

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
All Messages	Beginning of message.	Header Length/Field 1 STX
All Messages	End of message.	Footer Length/Field 1 ETX 3 Digit Decimal Checksum 1 CR

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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
Selected messages		<p>Location ID Length/Field</p> <p>2 Aisle 3 Segment 2 Level</p>
02	<p>Conveyor Move Storage Location Pallet, No Empty Needed.</p> <p>Purpose: This message is a response to the Triax Conveyor PLC to Host message type 01. It directs storage location pallet to destination and does not require the Conveyor PLC to provide an empty military pallet.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '02' 3 Destination '101'-'104' Workstation Lanes '201'-'204' Inbound to Crane Stations 7 Location ID 2 Status '00' - Successful Status 3 Reserved Field 5 Footer</p> <p>Total Message Length is 23.</p>
04	<p>Conveyor Move Storage Location Pallet, Empty Needed.</p> <p>Purpose: This message is a response to the Triax Conveyor PLC to Host message type 01. It directs storage location pallet to destination and requests the PLC to provide an empty military pallet.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '04' 3 Destination '101'-'104' Workstation Lanes '201'-'204' Inbound to Crane Stations 7 Location ID 2 Status '00' - Successful Status 3 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>

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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
06	<p>Conveyor Release Storage Location Pallet From Operator Workstation</p> <p>Purpose: This message is a response to the DSS Completion SMM. It directs storage location pallet from conveyor source. However, the pallet is not physically released to the recirculation line until the operator activates a manual switch.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '06' 3 Source '101'-'104' Operator Workstations 7 Location ID 2 Status '00' - Successful Status 3 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>
08	<p>Conveyor Confirm Arrival At Crane Inbound Station</p> <p>Purpose: This message is a response to the Triax Conveyor PLC to Host message type 03. It confirms that the storage location pallet arrived at the proper Crane Inbound station. Upon receipt of this message, the Host will generate a Host to Crane PLC message type 70 to begin a Stow operation.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '08' 3 Destination '201'-'204' Inbound to Crane Stations 7 Location ID 2 Status '00' - Successful Status 3 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>

DISTRIBUTION STANDARD SYSTEM

Equipment Control System

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MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
10	<p>Conveyor Confirm Arrival At Operator Workstation Acknowledge</p> <p>Purpose: This message is generated when the Conveyor PLC confirms that the storage location pallet arrived at the proper Operator Workstation lane with a Triax Conveyor PLC to Host type 07 messages.</p>	Length/Field 1 Header 2 Command Type - '10' 3 Destination '101'-‘104’ Operator Stations 7 Location ID 2 Status 3 Reserved Field 5 Footer Total Message Length is 23
12	<p>Conveyor Lock Lane For Receipt Induction Pallet Confirm</p> <p>Purpose: This message is response to the Triax Conveyor PLC to Host message type 05 to allow the movement of the military pallet from Receipt Induction to an Operator Workstation lane.</p>	Length/Field 1 Header 2 Command Type - '12' 3 Source Values '101'-‘104’ - Operator Workstations 2 Status ‘00’ - Successful Status 10 Reserved Field 5 Footer Total Message Length is 23

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
14	<p>Conveyor Lock Lane For Receipt Induction Pallet Deny</p> <p>Purpose: This message in response to the Triax Conveyor PLC to Host message type 05 to disallow the movement of the military pallet from Receipt Induction to an Operator Workstation lane.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '14' 3 Source Values '101'-'104' - Operator Workstations 2 Status '00' - Successful Status 10 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>
16	<p>Conveyor Confirm Arrival At Crane Outbound Station</p> <p>Purpose: This message is sent when the Host has received a successful Triax Crane PLC to Host message type 61 that indicates that a storage location has cleared the crane, is on the outbound conveyor station and is ready for conveyor transport.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '16' 3 Source Values '301'-'304' - Outbound from Crane Locations 7 Location ID 2 Status '00' - Successful Status 3 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>

Table 3.1.28.1-1 DDNV Host to Triax Conveyor PLC Message Formats

3.1.28.2 **DDNV Triax Conveyor PLC to Host Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
All Messages	Beginning of message.	Header Length/Field 1 STX
All Messages	End of message.	Footer Length/Field 1 ETX 3 Digit Decimal Checksum 1 CR
Selected Messages		Location ID Length/Field 2 Aisle 3 Segment 2 Level

01	<p>Conveyor Storage Location Pallet Scan</p> <p>Purpose: This message is sent when the PLC barcode scanner detects a valid storage location pallet barcode at one of three barcode scanners located on the recirculation loop.</p> <p>A special case of Conveyor Storage Location Pallet Scan (01) occurs at the scanner located at the dimensioning and weigh location. At this location, the Conveyor PLC tests additionally for dimension and weight data. If the slave pallets passes the dimension and weigh tests, the Conveyor PLC sends the Conveyor Storage Location Pallet Scan (01). If the slave pallet fails the dimension and weigh tests, the Conveyor PLC disallows movement of the slave pallet to the crane inbound locations and controls the movement of the slave pallet back to the origin workstation lane. The Conveyor PLC additionally displays a message back to the operator via Panel View screen notifying the operator that the pallet will return.</p>	<p>Length/Field</p> <table border="0"> <tr> <td>1</td><td>Header</td></tr> <tr> <td>2</td><td>Command Type - '01'</td></tr> <tr> <td>3</td><td>Source ID</td></tr> <tr> <td></td><td>Values: '001'-'003'</td></tr> <tr> <td>7</td><td>Location ID</td></tr> <tr> <td>2</td><td>Status</td></tr> <tr> <td></td><td>'00' - Successful Status</td></tr> <tr> <td>3</td><td>Reserved Field</td></tr> <tr> <td>5</td><td>Footer</td></tr> </table> <p>Total Message Length is 23</p>	1	Header	2	Command Type - '01'	3	Source ID		Values: '001'-'003'	7	Location ID	2	Status		'00' - Successful Status	3	Reserved Field	5	Footer
1	Header																			
2	Command Type - '01'																			
3	Source ID																			
	Values: '001'-'003'																			
7	Location ID																			
2	Status																			
	'00' - Successful Status																			
3	Reserved Field																			
5	Footer																			

03	<p>Conveyor Storage Location Pallet Arrival at Inbound to Crane Location</p> <p>Purpose: This message is sent when the PLC diverts a storage location pallet into a crane inbound station.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '03' 3 Source ID</p> <p>Values: '201'-'204', Crane Aisle Inbound</p> <p>7 Location ID 2 Status '00' - Successful Status</p> <p>3 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>
05	<p>Conveyor Lock Lane Request</p> <p>Purpose: This message is sent when the operator presses the manual control at an operator workstation lane to request a military pallet movement from the pallet induction area.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '05' 3 Source ID</p> <p>Values: '101'-'104' - Operator Workstations</p> <p>2 Status '00' - Successful Status</p> <p>10 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>

07	<p>Conveyor Storage Location Pallet Arrival at Operator Workstation Lane</p> <p>Purpose: This message is sent when the PLC diverts a storage location pallet into an operator workstation lane.</p> <p>When a military pallet arrives from the receipt induction area, the location ID field is zero filled.</p> <p>This message is not sent when a military pallet arrives from the pallet dispenser/collector.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '07' 3 Source ID</p> <p>Values: '101'-'104' - Operator Workstations</p> <p>7 Location ID 2 Status 3 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>
09	<p>Conveyor Confirm Arrival At Crane Outbound Station Acknowledge</p> <p>Purpose: This message is sent when the PLC detects that a storage location is present on the Outbound from Triax crane location in response to the Host to Triax Conveyor PLC message type 16.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '09' 3 Source ID</p> <p>Values: '301'-'304' - Source ID</p> <p>7 Location ID 2 Status '00' - Successful Status</p> <p>3 Reserved Field 5 Footer</p> <p>Total Message Length is 23</p>

Table 3.1.28.2-1 DNV Triax Conveyor PLC to Host Message Formats

3.1.28.3 **DDNV Host to Triax Crane PLC Messages**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
All Messages	Beginning of message.	Header Length/Field 1 STX
All Messages	End of message.	Footer Length/Field 1 ETX 3 Digit Decimal Checksum 1 CR
All Messages		Location ID Length/Field 2 Aisle 3 Segment 2 Level
50	<p>Crane Status Request</p> <p>Purpose: This message is the most common sent from the Host to the Crane PLC. It is sent first upon startup of the Host. The Host determines the periodicity of this message: it can be sent at any time.</p>	Length/Field 1 Header 2 Command Type - '50' 3 Aisle ID '001'-'004' Aisle Number 1 Heartbeat Always '0' 2 Status Code - '00' - Initial Message '61' - Invalid Checksum '62' - Invalid Msg Length '63' - Invalid Crane ID '64'-'69' - Reserved Comm Faults 3 Segment Number - '000'' 2 Level - '00' 4 Reserved Field 5 Footer Total Message Length is 23

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
60	<p>Crane Pick Request</p> <p>Purpose: This message is sent when the Host requests a storage location from the racks</p> <p>The normal Pick message sequence is <u>60/61</u>.</p>	Length/Field 1 Header 2 Command Type - '60' 3 Aisle ID '001'-'004' Aisle Number 1 Heartbeat Always '0' 2 Status Code '00' - Successful Status Segment Number - '000'-040' odd = left side; even = right side Cranes 1 & 2: facing H.11-A.11 Cranes 3 & 4 facing H.24-A.24 2 Level - '01'-'13' 4 Reserved Field 5 Footer Total Message Length is 23
70	<p>Crane Stow Request</p> <p>Purpose: This message is sent when the Host requests the crane to return a storage location to the racks.</p> <p>The normal Stow message sequence is 70/71.</p>	Length/Field 1 Header 2 Command Type - '70' 3 Aisle ID - '001'-'004' Aisle Number 1 Heartbeat - Always '0' 2 Status Code '00' - Successful Status Segment Number - '000'-040' odd = left side; even = right side Cranes 1 & 2: facing H.11-A.11 Cranes 3 & 4 facing H.24-A.24 2 Level - '01'-'13' 4 Reserved Field 5 Footer Total Message Length is 23
80	Reserved for DDDC Stackman	N/A

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
82	Reserved for DDDC Stackman	N/A
90	<p>Crane Clear Fault Request</p> <p>Purpose: This message is used to recover from a major fault.</p> <p>For example, this message would be sent upon receipt of a Crane Status Response ('51') with at a status of Crane Not In Auto ('82').</p> <p>The Crane PLC will not zero out the current command and location.</p>	Length/Field <ul style="list-style-type: none"> 1 Header 2 Command Type - '90' 3 Aisle ID - '001'-'004' Aisle Number 1 Heartbeat - Always '0' 2 Status Code - '00' '00' - Successful Status 3 Segment Number - '000' 2 Level - '00' 4 Reserved Field 5 Footer <p>Total Message Length is 23</p>
92	<p>Crane Resume Command Request</p> <p>Purpose: This message is used to recover from a minor movement fault only.</p> <p>For example, this message would be sent upon receipt of a Crane Status Response ('51') with at a status of Minor Movement Error ('71').</p> <p>The Crane PLC will not zero out the current command and location.</p>	Length/Field <ul style="list-style-type: none"> 1 Header 2 Command Type - '92' 3 Aisle ID '001'-'004' Aisle Number 1 Heartbeat Always '0' 2 Status Code '00' - Successful Status 3 Segment Number - '000' 2 Level - '00' 4 Reserved Field 5 Footer <p>Total Message Length is 23</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
98	<p>Crane Abort Movement Request</p> <p>Purpose: This message is sent whenever the Host must abort any action from or to storage location GGGLL. It is sent to abort any movement by the crane.</p> <p>For example, this message would be sent upon receipt of a Crane Status Response ('51') with a status of Bin Empty '74'.</p> <p>The Crane PLC will zero out the current command and location.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '98' 3 Aisle ID '001'-'004' Aisle ID</p> <p>1 Heartbeat - H Always '0'</p> <p>2 Status Code - '00' '00' - Successful Status</p> <p>3 Segment Number - '000'</p> <p>2 Level - '00'</p> <p>4 Reserved Field</p> <p>5 Footer</p> <p>(Note: The following non-standard locations are defined: '99998' = Pickup Location '99999' = Delivery Location '00000' = Unknown Location)</p> <p>Total Message Length is 23</p>

Table 3.1.28.3-1 DNV Host to Triax Crane PLC Message Formats

3.1.28.4 **DDNV Triax Crane PLC to Host Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
All Messages	Beginning of message.	Header Length/Field 1 STX
All Messages	End of message. The user selects message identification. This character can be used in a long series of commands to verify visually, using a monitor that the commands are sent.	Footer Length/Field 1 ETX 3 Digit Decimal Checksum 1 CR
All Messages		Location ID Length/Field 2 Aisle C*2 3 Segment C*3 2 Level C*2

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
51	<p>Crane Status Response</p> <p>Purpose: This message is the most common sent from the Triax Crane PLC to the Host. This message is sent as a response to the Host message #50. This message is also sent from the Triax Crane PLC to the Host whenever there is an error condition in an active Stow (70/71) or Pick (60/61) sequence.</p> <p>Note on Major Error Types: When the Triax Crane detects a Major Fault, it also returns a Value in the Major Error Type Field.</p> <ul style="list-style-type: none"> '01' - Emergency Stop Is Activated '02' - Slack Cable Fault '03' - Vertical Overspeed Fault '04' - BASIC Module Communication Fault '05' - Laser Communication Fault '06' - Horizontal Movement Fault '07' - Vertical Movement Fault '08' - Shuttle Movement Fault '09' - Load Position Fault '10' - Cycle Overtime Fault <p>The errors are listed in order of increasing severity.</p>	<p>Length/Field</p> <p>1 Header</p> <p>2 Command Type - '51'</p> <p>3 Crane ID - '001'-'004'</p> <p>1 Heartbeat Always '0'</p> <p>2 Status Code - '00'-'99'</p> <p>'71' - Minor Movement Fault '72' - Invalid Command '73' - Bin Full '74' - Bin Empty '75'-'79' - Reserved Minor Faults</p> <p>'81' - Major Fault '82' - Crane Not In Auto '83'-'89' - Reserved Major Faults</p> <p>'91' - Executing Command '92' - Waiting For Command '93' - Waiting For Resume Cmd '94' - Aborting Command '95'-'99' - Reserved Statuses</p> <p>3 Segment Number odd = left side; even = right side</p> <p>Cranes 1 & 2: facing H.11-A.11 Cranes 3 & 4 facing H.24-A.24</p> <p>2 Level - '01'-'13'</p> <p>1 Loaded Status 0 = No Load Onboard 1 = Load Onboard</p> <p>1 Reserved Field</p> <p>2 Major Error Type</p> <p>5 Footer</p> <p>(Note: The following non-standard locations are defined: '99998' = Pickup Location '99999' = Delivery Location '00000' = Unknown Location)</p> <p>Total Message Length is 23</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
61	<p>Crane Pick Complete</p> <p>Purpose: This message is sent as a response to the Host to Triax Crane PLC message #60 to acknowledge that the Crane has successfully placed a storage location on the outbound Delivery Station. This is the last step in an outbound storage location movement.</p> <p>The normal Pick message sequence is 60/61.</p> <p>Following this message with a successful status, ECS will send the Host to Triax Conveyor PLC message #16.</p> <p>Note on Major Error Types: When the Triax Crane detects a Major Fault, it also returns a Value in the Major Error Type Field.</p> <ul style="list-style-type: none"> '01' - Emergency Stop Is Activated '02' - Slack Cable Fault '03' - Vertical Overspeed Fault '04' - BASIC Module Communication Fault '05' - Laser Communication Fault '06' - Horizontal Movement Fault '07' - Vertical Movement Fault '08' - Shuttle Movement Fault '09' - Load Position Fault '10' - Cycle Overtime Fault <p>The errors are listed in order of increasing severity.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '61' 3 Crane ID - '001'-'004' Crane Number</p> <p>1 Heartbeat Always '0'</p> <p>2 Status Code - '00' - Successful Status '61' - Invalid Checksum '62' - Invalid Msg Length '63' - Bad Crane Status '64'-'69' - Reserved Comm. Faults</p> <p>'71' - Minor Movement Fault '72' - Invalid Command '73' - Bin Full '74' - Bin Empty '75'-'79' - Reserved Minor Faults</p> <p>'81' - Major Fault '82' - Crane Not In Auto '83'-'89' - Reserved Major Faults</p> <p>'90s' series status ignored for this message</p> <p>3 Segment Number - '999' 2 Level - '99' 1 Loaded Status 0 = No Load Onboard 1 = Load Onboard</p> <p>1 Reserved Field 2 Major Error Type 5 Footer</p> <p>(Note: The non-standard location is always '99999' for this message.)</p> <p>Total Message Length is 23</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
71	<p>Crane Stow Complete</p> <p>Purpose: This message is sent as a response to the Host to Triax Crane PLC message #70 to acknowledge that the Host has requested a crane pallet to stow a storage location.</p> <p>Note on Major Error Types: When the Triax Crane detects a Major Fault, it also returns a Value in the Major Error Type Field.</p> <ul style="list-style-type: none"> '01' - Emergency Stop Is Activated '02' - Slack Cable Fault '03' - Vertical Overspeed Fault '04' - BASIC Module Communication Fault '05' - Laser Communication Fault '06' - Horizontal Movement Fault '07' - Vertical Movement Fault '08' - Shuttle Movement Fault '09' - Load Position Fault '10' - Cycle Overtime Fault <p>The errors are listed in order of increasing severity.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '71' 3 Crane ID '001'-'004' Crane Number</p> <p>1 Heartbeat Always '0'</p> <p>2 Status Code - '00' - Successful Status '61' - Invalid Checksum '62' - Invalid Msg Length '63' - Bad Crane Status '64'-'69' - Reserved Comm. Faults</p> <p>'71' - Minor Movement Fault '72' - Invalid Command '73' - Bin Full '74' - Bin Empty '75'-'79' - Reserved Minor Faults</p> <p>'81' - Major Fault '82' - Crane Not In Auto '83'-'89' - Reserved Major Faults</p> <p>'90s' series status ignored for this message</p> <p>3 Segment Number - '001'-040' odd = left side; even = right side Cranes 1 & 2: facing H.11-A.11 Cranes 3 & 4 facing H.24-A.24</p> <p>2 Level -: '01'-'13'</p> <p>1 Loaded Status 0 = No Load Onboard 1 = Load Onboard</p> <p>1 Reserved Field</p> <p>2 Major Error Type</p> <p>5 Footer</p> <p>Total Message Length is 23</p>

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
81	Reserved for DDDC Stackman	N/A
83	Reserved for DDDC Stackman	N/A

Table 3.1.28.4-1 DNV Triax Crane PLC to Host Message Formats

3.1.29 SECS-RI29.0: New Cumberland Active Item Package Interface

The New Cumberland Active Item Package Interface establishes communications between the ECS and the New Cumberland Active Item Package System.

Communications protocol - RS-232 Serial ASCII-7 bit 9600-Baud Asynchronous

Rules of Communication: When a message is received and the checksums equate an ACK will be transmitted. When a message is received and the checksums do not equate the NAK will be transmitted. Upon receiving a NAK the previous message will be retransmitted up to 3 times, then discarded. If no acknowledgement is received within ½ second the previous message will be retransmitted up to 3 times, then discarded. Message discards will be interpreted as jackpot (reject) moves.

Checksum: This character is the sum of all characters in the messages including STX and ETX. The checksum is and'ed with a 7F hex and then or'ed with a 40 hex to avoid conflicts with STX and ETX.

Startup messages must cause the PLC to trigger an alarm prior to equipment activation. After the alarm is triggered and the equipment is activated then send a startup complete message 07. Once all equipment stops send a shutdown complete message 07.

3.1.29.1 New Cumberland Active Item Host to Active Item Package Message Formats

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
08 - Startup /Shutdown Msg	Sends Startup/Shutdown from ECS AI subcontroller to Active Item Package System.	STX - Char 1 - Hex '02' Message Type - Char 2 - '08' PLC Number - Char 2 - '20' Status - Char 1 - '1' Startup '2' Shutdown ETX - Char 1 - Hex '03' Checksum - Char 1
01 AI Move Msg	Movement command of package. AWOS is '001', CCP is '002', and Tote is '003'.	STX - Char 1 - Hex '02' Message Type - Char 2 - '01' Scanner Number - Char 2 - '01' Destination - Char 3 - '001', '002', '003' Control Number - Char 7 ETX - Char 1 - Hex '03' Checksum - Char 1

Table 3.1.29.1-1 New Cumberland Active Item Host to Active Item Package Message Formats

3.1.29.2 Active Item Package (Scanner, PLC) to Host Message Formats

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
ACK	Response sent to the host when message received properly. (Valid)	ACK - Char 1 - Hex '06'
NAK	Response sent to the host when message received improperly. (Invalid)	NAK - Char 1 - Hex '15'
09 - AI Scanner Reply	Shows message received by scanner. No reads will fill control number field with seven '?'s.	0 STX - Char 1 - Hex '02' 2-3 Message Type - Char 2 - '09' 3-4 PLC Number - Char 2 - '20' 5-12 Control Number - Char 7 13 ETX - Char 1 - Hex '03' 14 Checksum - Char 1
07 - AI Startup/ Shutdown Complete Msg	Shows Startup or Shutdown was received and completed from PLC. Startup is a '4' and Shutdown is a '5'.	0 STX - Char 1 - Hex '02' 2-3 Message Type - Char 2 - '07' 3-4 PLC Number - Char 2 - '20' 4 Status - Char 1 - '4' or '5' 5 ETX - Char 1 - Hex '03'

Table 3.1.29.2-1 Active Item Package (Scanner, PLC) to Host Message Formats

3.1.30 **SECS-RI30.0: Navy HKS ASRS Stacker Interface**

The Navy HKS ASRS Stacker Interface provides connectivity between the ECS and the ASRSs controlled by Norfolk and DDMA HKS ASRS Cranes.

Communications protocol - RS-232, Serial, 1200 Baud, Asynchronous

3.1.30.1 **Transactions exchanged between the ECS and the HKS Crane**

- Messages sent between ECS and the cranes start with a SOH character (hex 01).
- Next the message is inserted.
- This is followed by an ETB (hex 17).
- Next is a two character checksum. The checksum is computed using the rules supplied by HK (sum all previous characters, convert to ASCII).
- Following the checksum is a CR (hex 0D).
- ECS sends Acknowledgement, Query and Motion (Reset, Pickup, Move and Deposit) messages.
- The cranes send Query, Acknowledgement and Response to Motion messages.

Transaction Name	Initiated By ECS Action	Trans. Code	Originator
Pickup Tray Motion Message	Subcontroller	Byte 1 SOH Byte 2 0 Byte 3 Y or Z Byte 4 P Byte 5 1 or 2 Right or Left Byte 6 S - Single deep Byte 7 Column Byte 8 Column Byte 9 Column Byte 10 Height Byte 11 Height Byte 12 ETB Byte 13 Checksum Byte 14 Checksum Byte 15 CR	ECS

Transaction Name	Initiated By ECS Action	Trans. Code	Originator
Deliver Tray Motion Message	Subcontroller	Byte 1 SOH Byte 2 0 Byte 3 Y or Z Byte 4 D Byte 5 1 or 2 Right or Left Byte 6 S Single deep Byte 7 Column Byte 8 Column Byte 9 Column Byte 10 Height Byte 11 Height Byte 12 ETB Byte 13 Checksum Byte 14 Checksum Byte 15 CR	ECS
Action Complete Response Message	Crane	Byte 1 SOH Byte 2 0 Byte 3 Y or Z Byte 4 Response Code Byte 5 Response Code Byte 6 Byte 7 Byte 8 Byte 9 Byte 10 Byte 11 Byte 12 0 or 1 Load status (empty or loaded) Byte 13 ETB Byte 14 Checksum Byte 15 Checksum Byte 16 CR	HKS ASRS Crane
Query	Subcontroller and/or Crane	Byte 1 SOH Byte 2 0 Byte 3 Q Byte 4 ETB Byte 5 Checksum Byte 6 Checksum Byte 7 CR	HKS ASRS Crane and ECS

Transaction Name	Initiated By ECS Action	Trans. Code	Originator
ACKNOWLEDGE MENT	Subcontroller and/or Crane	Byte 1 SOH Byte 2 0 Byte 3 1 or 2 Byte 4 ETB Byte 5 Checksum Byte 6 Checksum Byte 7 CR	HKS ASRS Crane and ECS
Reset Message	Subcontroller	Byte 1 SOH Byte 2 0 Byte 3 Y or Z Byte 4 K Byte 5 I Byte 6 ETB Byte 7 Checksum Byte 8 Checksum Byte 9 CR	ECS
Move Crane Motion Message	Subcontroller	Byte 1 SOH Byte 2 0 Byte 3 Y or Z Byte 4 M Byte 5 1 or 2 Right or Left Byte 6 S - Single deep Byte 7 Column Byte 8 Column Byte 9 Column Byte 10 Height Byte 11 Height Byte 12 ETB Byte 13 Checksum Byte 14 Checksum Byte 15 CR	ECS

Table 3.1.30.1-1 Transactions from ECS to Norfolk and DDMA HKS ASRS Stacker

3.1.31 **SECS-RI31.0 Hill AWOS/DAWS Rules of Communications**

The Interface allows for communications between the ECS and the DAWS Controller.

Communication protocol - RS232, Serial, ASCII, Default Values, 8 bit, 9600 baud, Asynchronous, 0 stop bits, No Parity unless specified differently in the ecs.ini file. Current ecs.ini file is set at 7 bit, 9600 baud, Asynchronous, 2 stop bits, even parity.

3.1.31.1 **DAWS to ECS Message**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	Dimension, Weight and Control Number Message	<p>Message Type: n/a Length:22</p> <p>Start of Text: Hex 02</p> <p>Package Length: ##</p> <p>Package Width: ##</p> <p>Package Height: ##</p> <p>Package Weight: ###.##</p> <p>Control Number: CCCCCCCC</p> <p>Carriage Return: Hex 0D</p> <p>Line Feed: Hex 0A</p>

Table 3.1.31.1-1 DAWS to ECS Message

3.1.32 **SECS-RI32.0:** **Red River AWOS Rules of Communications**

The Interface allows for communications between the ECS and the AWOS PLC.

Communication protocol - TCP/IP.

3.1.32.1 **PLC to ECS Message**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	Dimension, Weight and Control Number Message	Message Type: n/a Length:22 Start of Text: Hex 02 Package Length: ## Package Width: ## Package Height: ## Package Weight:##.## Control Number:CCCCCC Carriage Return: Hex 0D Line Feed: Hex 0A

Table 3.1.32.1-1 PLC to ECS Message

3.1.33 **SECS-RI33.0: Norfolk Virginia DPI Tote Interface**

The Norfolk Virginia Tote Interface enables ECS to communicate with the DPI Conveyor PLC.

Communications protocol - RS-232, Serial, ASCII-8 bit, 9600 Baud, Asynchronous, Even Parity, 1 Stop Bit.

3.1.33.1 **Norfolk Virginia Tote Message Formats**

MESSAGE DESCRIPTION	INITIATED BY ECS	MESSAGE FORMAT	
Package Destination Reply	ECS generated	STX	Hex 02
		Package Barcode	7 Character ASCII
		Barcode Data	
		Divert ID	3 Character ASCII
		Destination	
		ETX	Hex 03
Package Destination Request	DPI PLC generated	STX	Hex 02
		Package Barcode	7 Character ASCII
		Barcode Data	
		Scanner ID	3 Character ASCII
		Scanner Number	
		ETX	Hex 03

Table 3.1.33.1-1 Norfolk Virginia Tote Message Formats

3.1.34 **SECS-RI34.0: Oklahoma City Tote/Package Conveyor Interface**

The Oklahoma City Tote/Package Conveyor Interface establishes communications between the ECS and the Oklahoma City Tote/Package Conveyor System.

Communications protocol - RS-232 Serial ASCII-7 bit 9600-Baud Asynchronous

No ACK's or NAK's (acknowledgements) or checksums will be sent. Messages will end in a carriage return. Misreads will be represented by question marks. Internal message from AWOS to Tote Package will be called T48 message.

3.1.34.1 **Oklahoma City Tote/Package Conveyor Host to Tote/Package Conveyor Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
Move Msg for PPP&M Receiving, Packing	Movement command of package.	STX – Start of text Scanner Number – Char 2 Destination – Char 7 CR– Carriage Return
Move Msg for Storage	Movement command of package.	STX – Start of text Scanner Number – Char 2 Destination – Char 8 CR– Carriage Return
Move Msg for Shipping	Movement command of package.	STX – Start of text Scanner Number – Char 2 Destination – Char 7 CR– Carriage Return LF – Line Feed

Table 3.1.34.1-1 Tote/Package Conveyor Host to Tote/Package Conveyor Message Formats

3.1.34.2 **Tote/Package Conveyor (Scanner) to Host Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
Scanner Reply	Shows message received by scanner. No reads will fill control number field with seven '?'s.	0 STX – Char 1 – Hex '02' 1-2 Scanner Number – Char 2' 3-9 Control Number – Char 7 10 CR – Char 1 – ASCII Carriage Return 11 LF – Char 1 – ASCII Line Feed

Table 3.1.34.2-2 Tote/Package Conveyor (Scanner) to Host Message Formats

3.1.34.3 **Tote/Package Conveyor (Internal) from AWOS DnProcess Message Format**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
T48 - AWOS lane message	Tells tote package subsystem which lane to send package to.	0-4 To – Char 5 5-9 From – Char 5 10-12 Size – Char3 13-15 Message type- T48- Char 3 16-17 Scanner Number – Char 2 18-25 Lane – Char 8 26-32 Control number– Char 7

Table 3.1.34.3-3 Tote/Package Conveyor (Internal) from AWOS Subcontroller Message Format

3.1.35 **SECS-RI35.0:** **DDNV Y109 Interface**

The DDNV Y109 Interface establishes communications between the Host and the DDNV Y109 Conveyors. The DDNV Y109 consists of a Conveyor PLC that controls a pallet sortation system and a case sortation system.

Communications protocol - RS-232 Serial ASCII-8 Bit 1 Stop Bit No Parity
9600-Baud Asynchronous

The messages follow the general format:

- Header of length 1 character, indicated by a Start of Text;
- Message Body of length 23 characters;
- Footer of length 5 characters which include an End of Text character, 3 digits of checksum, and is concluded by a Carriage Return character.

Note: The DDNV Y109 checksum calculation is identical to the DDNV Triax checksum calculation.

Both the Host and the PLCs will validate messages in the following manner:
The checksum and the message length will be calculated.
The receiver echoes the message.
If the message passes all communication tests, the echoed message will contain '00' in the status field.
If the checksum calculation fails, the echoed message will contain '61' in the status field.
If the message length fails, the echoed message will contain '62' in the status field.
No other field in the echoed message will be altered when a 60 series error code is exchanged.

The messages are all of fixed total length 29.

Any unused field is zero filled.

The checksum number will be the sum total of all the decimal values of the ASCII characters between STX and ETX, including STX and ETX. If the checksum is greater than 999, eliminate the most significant digit. The three remaining checksum decimals are then converted into their ASCII equivalents.

Example: Message to be sent from Host to Rack Storage Pallet PLC.
Move Control Number ‘AAAAA111’ to Rack Storage Lane 2.

STX / 02 / 100 / AAAAA111 / 12345/ 102 / 0/00 / ETX

ASCII string: STX = 02; ETX = 03; 0 = 48; 1=49; 2=50; 3=51; 4=52;
5=53; A = 65

The ASCII string becomes

02,48,50,49,48,48,65,65,65,49,49,49,49,49,50,51,52,53,49,48,50,
48,48,48,03

Add all decimal values:

02+48+50+49+48+48+65+65+65+65+49+49+49+49+49+50+51+
52+53+49+48+50+48+48+03 = 1203

Delete the most significant digit and convert three ASCII characters to their decimal equivalent (2 = 50, 0 = 48, 3 = 51) and checksum becomes 50,48,51

Add checksum to end of string and add CR (13 decimal) to complete message.

Final message is:

02,48,50,49,48,48,65,65,65,49,49,49,49,49,50,51,52,53,49,48,50,
48,48,48,03, 50,48,51,13

3.1.35.1 DDNV Host to Y109 Conveyor PLC Message Formats

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
All Messages	Beginning of message.	Header Length/Field 1 STX
All Messages	End of message.	Footer Length/Field 1 ETX 3 Checksum 1 CR

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
02	<p>Pallet Sortation Move Request</p> <p>Purpose: This message is a response to the Y109 Conveyor PLC to Host message type 01. It directs a pallet to a rack storage destination.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '02' 3 Scanner ID 7 Control Number 5 PLC Sequence Number 3 Destination 1 Reserved Field 2 Checksum Status 5 Footer</p> <p>Total Message Length is 29. No Read Control Number is '??????'.</p>
04	<p>Case Sortation Move Request</p> <p>Purpose: This message is a response to the Y109 Case Sortation PLC to Host message type 03. It directs case to specific case sorter lane.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '04' 3 Scanner ID 7 Control Number 5 PLC Sequence Number 3 Destination 1 Reserved Field 2 Checksum Status 5 Footer</p> <p>Total Message Length is 29. No Read Control Number is '??????'.</p>
06	<p>Mode Request Message</p> <p>Purpose: This message is a PLC Mode request message from the ECS to the Y109 PLCs. This message may sent at any time by the operator accessing the ECS User Interface or internally by ECS to determine the current mode of the PLC.</p>	<p>Length/Field</p> <p>1 Header 2 Command Type - '06' 3 Scanner ID 16 Reserved Field 2 Checksum Status 5 Footer</p> <p>Total Message Length is 29</p>

Table 3.1.35.1-1 DNV Host to Y109 Conveyor PLC Message Formats

3.1.35.2 **DDNV Y109 Conveyor PLC to Host Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
All Messages	Beginning of message.	Header Length/Field 1 STX
All Messages	End of message.	Footer Length/Field 1 ETX 3 Checksum 1 CR
01	Rack Storage Sorter Induction Pallet Scan Message Purpose: This message is sent when the PLC barcode scanner detects a valid pallet barcode at the scanner at Rack Storage Induction.	Length/Field 1 Header 2 Command Type - '01' 3 Scanner ID 7 Control Number 5 PLC Sequence Number 4 Reserved Field 2 Checksum Status 5 Footer Total Message Length is 29 No Read Control Number is '???????'.
03	Case Sortation Induction Pallet Scan Message Purpose: This message is sent when the PLC barcode scanner detects a valid pallet barcode at the scanner at Case Sortation Induction.	Length/Field 1 Header 2 Command Type - '03' 3 Scanner ID 7 Control Number 5 PLC Sequence Number 4 Reserved Field 2 Checksum Status 5 Footer Total Message Length is 29 No Read Control Number is '???????'.

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT																		
07	Not Used	N/A																		
09	<p>Mode Response Message</p> <p>Purpose: This message is a mode response message from the Y109 PLCs to the ECS.</p> <p>This message returns the Automatic or Manual Mode of the PLC. It may be sent at any time when the PLC operator changes the mode of operation of the PLC by switch or by Panel View access.</p>	<p>Length/Field</p> <table> <tr><td>1</td><td>Header</td></tr> <tr><td>2</td><td>Command Type - '09'</td></tr> <tr><td>3</td><td>Scanner ID</td></tr> <tr><td>1</td><td>Mode</td></tr> <tr><td></td><td>'A' - Automatic Mode</td></tr> <tr><td></td><td>'M' - Manual Mode</td></tr> <tr><td>15</td><td>Reserved Field</td></tr> <tr><td>2</td><td>Checksum Status</td></tr> <tr><td>5</td><td>Footer</td></tr> </table> <p>Total Message Length is 29</p>	1	Header	2	Command Type - '09'	3	Scanner ID	1	Mode		'A' - Automatic Mode		'M' - Manual Mode	15	Reserved Field	2	Checksum Status	5	Footer
1	Header																			
2	Command Type - '09'																			
3	Scanner ID																			
1	Mode																			
	'A' - Automatic Mode																			
	'M' - Manual Mode																			
15	Reserved Field																			
2	Checksum Status																			
5	Footer																			

Table 3.1.35.2-1 DNV Y109 Conveyor PLC to Host Message Formats

3.1.36 **SECS-RI36.0: DDPW PS Tote Conveyor Interface**

The DDPW PS Tote Conveyor Interface establishes communications between the ECS and the DDPW PS Tote Conveyor System.

Communications protocol - RS-232 Serial ASCII-7 bit 9600-Baud Asynchronous

3.1.36.1 **DDPW PS Tote Conveyor ECS Host to Tote Conveyor Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
Tote Move Msg.	Directs movement of a tote. ECS to PLC.	STX - Char 1 - Hex '02' Conveyance Number - Char 7 Destination - Char 3 Carriage Return - Char 1 - ASCII CR Line Feed - Char 1 - ASCII LF
Tote PLC Startup Msg	Sends startup message to PLC when pick is initiated from DSS.	STX – Char 1 – Hex ‘02’ Scanner Zone Area – Char 2 Carriage Return – Char 1 – ASCII CR Line Feed – Char 1 – ASCII LF

Table 3.1.36.1-1 PS Tote Conveyor Host to Tote Conveyor Message Formats

3.1.36.2 **PS Tote Conveyor (Scanners→PLCs) to ECS Host Message Formats**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
Tote PLC Scan Msg	Shows message received by PLC based on scan input. No reads will fill scanner number field with 3 zeroes.	STX - Char 1 - Hex '02' Conveyance Number - Char 7 Scanner Number - Char 3 Carriage Return - Char 1 - ASCII CR Line Feed - Char 1 - ASCII LF

Table 3.1.36.2-1 PS Tote Conveyor PLC Message Format

3.1.37 **SECS-RI37.0: Air Force HKU ASRS Stacker Interface**

The Air Force HKU ASRS Stacker Interface provides connectivity between the ECS and the PLCs controlling the HK System Cranes.

Communications protocol - RS-232, Serial, 1200 Baud, Asynchronous

3.1.37.1 **Transactions exchanged between the ECS and the PLC**

MESSAGE TYPE	INITIATED BY/ ECS ACTION	MESSAGE DESCRIPTION	MESSAGE FORMAT
Retrieve Pan ECS →	DSS SMM or User Interface	Retrieve Tray	<ul style="list-style-type: none"> • Message Type (2 characters) 01 • Response Code (2 characters) • Not Required (Zero Fill) • Pan ID (6 characters) • Pan ID from Pan
Retrieve Pan Complete ECS ←	PLC Response	Retrieve Complete	<ul style="list-style-type: none"> • Message Type (2 characters) 02 • Response Code (2 characters) • Pan ID (6 characters) • Pan ID from Pan
Store Pan ECS →	DSS SMM or User Interface	Store Tray	<ul style="list-style-type: none"> • Message Type (2 characters) 03 • Response Code (2 characters) • Not Required (Zero Fill) • Pan ID (6 characters) • Not Required (Zero Fill)
Store Pan complete ECS ←	PLC Response	Store Tray Complete	<ul style="list-style-type: none"> • Message Type (2 characters) 04 • Response Code (2 characters) • Pan ID (6 characters) • Pan ID from Pan

MESSAGE TYPE	INITIATED BY/ ECS ACTION	MESSAGE DESCRIPTION	MESSAGE FORMAT
Alert On ECS →	DSS SMM or User Interface	Turn Alert Light On	<ul style="list-style-type: none"> • Message Type (2 characters) 05 • Response Code (2 characters) Not Required (Zero Fill) • Pan ID (6 characters) Not Required (Zero Fill)
Alert Off ECS →	DSS SMM or User Interface	Turn Alert Light Off	<ul style="list-style-type: none"> • Message Type (2 characters) 06 • Response Code (2 characters) Not Required (Zero Fill) • Pan ID (6 characters) Not Required (Zero Fill)
Wipe Conveyor ECS →	DSS SMM or User Interface	Clear Workstation	<ul style="list-style-type: none"> • Message Type (2 characters) 07 • Response Code (2 characters) Not Required (Zero Fill) • Pan ID (6 characters) Not Required (Zero Fill)
Wipe Conveyor Complete ECS ←	PLC Response	Workstation Cleared	<ul style="list-style-type: none"> • Message Type (2 characters) 08 • Response Code (2 characters) Not Required (Zero Fill) • Pan ID (6 characters) Not Required (Zero Fill)
Conveyor Status ECS ←	PLC Information	Conveyor Status	<ul style="list-style-type: none"> • Message Type (2 characters) 08 • Response Code (2 characters) • Pan ID (6 characters) Not Required (Zero Fill)

Table 3.1.37.1-1 Transactions from ECS to DDHU HKU ASRS Stacker

3.1.38 **SECS-RI38.0: CCP and Mission Sorters**

The DDJC Sorter Interface provides a communications link between ECS and DDJC Sorters.

Communications protocol - RS- 232 Serial ASCII-8 bit 9600 Baud Asynchronous with no parity and one stop bit.

3.1.38.1 **Message Formats from ECS to CCP and Mission Sorters**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	<p>Move message</p> <p>Purpose: This message sends the sorter destination.</p>	<p>Message Type: N/A Length: 4</p> <p>Destination - #####</p>

Table 3.1.38.1-1 Message Formats from ECS to CCP and Mission Sorters

3.1.38.2 **Message Formats from CCP Sorter to ECS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	<p>Package Scanned</p> <p>Purpose: This message tells ECS which control number has been scanned.</p>	<p>Message Type: N/A Length: 7</p> <p>Control Number - #####</p>

Table 3.1.38.2-1 Message Formats from CCP Sorter to ECS

3.1.38.3 **Message Formats from Mission Sorter to ECS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	<p>Package Scanned</p> <p>Purpose: This message tells ECS which control number has been scanned.</p>	<p>Message Type: N/A Length: 7</p> <p>Control Number - #####</p>

Table 3.1.38.3-1 Message Formats from Mission Sorter to ECS

3.1.38.4 **Message Format from ECS to DSS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
M02	<p>Package Arrival</p> <p>Purpose: This message informs DSS that the package has passed the sorter scanner for tracking purposes.</p>	<p>Message Type: M02 Length: 80</p> <p>Control Number - #####</p> <p>Source – CCP or Mission</p> <p>Option - 01</p> <p>Program – BN3W</p>

Table 3.1.38.4-1 Message Format from ECS to DSS

3.1.38.5 **Message Formats from ECS to CCP and Mission Sorters**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	<p>Move message</p> <p>Purpose: This message sends the sorter destination with carriage return on end for Mission (and other) sorter. CCP has no carriage return on end. If no control number or bad read, then send 4 zeroes.</p>	<p>Message Type: N/A Length: 5</p> <p>CCP Destination - ####</p> <p>Mission Destination - #####cr</p>

Table 3.1.38.5-1 Message Formats from ECS to CCP and Mission Sorters

3.1.38.6 **Message Formats from CCP Sorter to ECS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	<p>Package Scanned</p> <p>Purpose: This message tells ECS which control number has been scanned.</p>	<p>Message Type: N/A Length: 7</p> <p>Control Number - #####</p>

Table 3.1.38.6-1 Message Formats from CCP Sorter to ECS

3.1.38.7 **Message Formats from Mission Sorter to ECS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	Package Scanned Purpose: This message tells ECS which control number has been scanned.	Message Type: N/A Length: 7 Control Number - #####

Table 3.1.38.7-1 Message Formats from Mission Sorter to ECS

3.1.38.8 **Message Format from ECS to DSS**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
M02	Package Arrival Purpose: This message informs DSS that the package has passed the sorter scanner for tracking purposes.	Message Type: M02 Length: 80 M02 Format (same as AWOS) Control Number - ##### Source – CCP or Mission Option - 01 Program – BN3W

Table 3.1.38.8-1 Message Format from ECS to DSS

3.1.39 **SECS-RI39.0: DDMA AWOS Rules of Communications**

The Interface allows for communications between the ECS and the AWOS PLC.

Communication protocol - RS-232 Serial ASCII-7 bit 9600-Baud Asynchronous.

3.1.39.1 **PLC to ECS Message**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
N/A	Dimension, Weight and Control Number Message	Message Type: n/a Length:22 Start of Text: Hex 02 Package Length: ## Package Width: ## Package Height: ## Package Weight:###.## Control Number:CCCCCC Carriage Return: Hex 0D Line Feed: Hex 0A

Table 3.1.39.1-1 PLC to ECS Message DDMA

3.1.39.2 **ECS to PLC Message**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
01	Destination and Control Number Message	Message Type: 01 Length:17 Start of Text: Hex 02 Message Type: 01 Scanner Number: 01 Destination: ### Control Number:CCCCCC Carriage Return: Hex 0D Line Feed: Hex 0A

Table 3.1.39.2-2 ECS to PLC Message DDMA

3.1.40 **SECS-RI40.0: DDDE Package Conveyor System Rules of Communications**

The Interface allows for communications between the ECS and the PCS PLC.

Communication protocol - RS-232 Serial ASCII-7 bit 9600-Baud Asynchronous.

3.1.40.1 **PLC to ECS Message**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
03	Dimension, Weight and Control Number Message	Start of Text: Hex 02 Length:24 Message Type: 03 Package Length: ## Package Width: ## Package Height: ## Package Weight:##.## Control Number:CCCCCC Carriage Return: Hex 0D Line Feed: Hex 0A
02	Scanner Reply	Start of Text: Hex 02 Length:22 Message Type: 03 Scanner Number: ## Control Number: CCCCCCC Carriage Return: Hex 0D Line Feed: Hex 0A

Table 3.1.40.1-1 PLC to ECS Message DDDE PCS

3.1.40.2 **ECS to PLC Message**

MESSAGE TYPE	MESSAGE DESCRIPTION	MESSAGE FORMAT
01	Destination and Control Number Message	Start of Text: Hex 02 Length:17 Message Type: 01 Scanner Number: xx Destination: ### Control Number: CCCCCCC Carriage Return: Hex 0D Line Feed: Hex 0A

Table 3.1.40.2-2 ECS to PLC Message DDDE PCS

4.0

NOTES

APPENDIX A

Not applicable.SMM FORMAT

SMM TABLE 1.0

SMM	Session ID	SEQ	Con No	Ship U No	WRHS Loc	Destination	Source	2 nd Dest	3 rd Dest	Conv	2 nd Conv	Hndlgr Unit	IPC Flag	Type	Date	PGU
RETRIEVE	Y	Y	Y	Y	Y	FULL	Work Sta			Y	TIME		R/E	P	TIME	RFE2
	Y	Y	Y	Y	Y	PARTIAL	VTAM ID			Y	TIME		R/E	P/L/C/I	TIME	WM38
	Y	Y	Y	Y	Y	VTAM L/R	VTAM ID			Y	TIME		R/E	P/L/C/I/S	TIME	WM18
	Y	Y	Y	Y	Y	VTAM	VTAM ID			Y	TIME		R/E	P/L/C/I/S	TIME	WM02
RETURN	Y	Y	Y	Y	Y	VTAM	VTAM ID	STRETCH	Y			C	S	TIME	Q171	
	Y	Y	Y	Y	Y	VTAM	VTAM ID			Y			C	S	TIME	RFWF
	Y	Y	Y	Y	Y	VTAM	VTAM ID			Y			C	S	TIME	RVWF
	Y	Y	Y	Y	Y	VTAM	VTAM ID			Y			C	S	TIME	WM06
WORK STA DESN	Y	Y				VTAM	VTAM ID			Y	TIME		Z	P/L/C/I/S	TIME	WM18
CLEAR WKLD	Y	Y				VTAM	VTAM ID			Y	TIME		Z	P/L/C/I/S	TIME	WM38
	Y	Y				WHSE/AIS				W			W		TIME	SEC1
	Y	Y				WHSE/AIS	VTAM ID			W	TIME		Z	N	TIME	WM02
	Y	Y				VTAM	VTAM ID			W			Z	N	TIME	WM18
	Y	Y				VTAM	VTAM ID			W			Z	N	TIME	WM38
TRANSFER	Y	Y				Y				Y	TIME		T	T	TIME	WM31
COMPLETIONS	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	BN1A
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	BN1X
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	BN2H
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	BN2K
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	BN4A
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	B32R
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	B35B
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	B37B
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	RFKB
	Y	Y				VTAM	VTAM ID			Y			C	P	TIME	RES1
AWOS COMPL	Y	Y				AWOS				Y			C	P	TIME	RFS5
AWOS ROUTING	Y	Y				1ST LANE				Y			C	P	TIME	QM12
						2ND LANE				Y			G	P	TIME	SPC1
						1ST LANE				Y			G	P	TIME	SPC2
						1ST LANE				Y			G	P	TIME	SPC5

DISTRIBUTION STANDARD SYSTEM
Equipment Control System

September 8, 2004

SMM	Session ID	SEQ	Con No	Ship U No	WRHS Loc	Destination	Source	2 nd Dest	3 rd Dest	Conv	2 nd Conv	Hndlq Unit	IPC Flag	Type	Date	PGU
	Y	Y	Y		1ST LANE			LANE	2ND LANE				G	P	TIME	SPC8
CCP RECEIVING	Y	Y	Y	Y	AREA/LAN	VTAM ID			Y		Y		D	S	TIME	E53B
	Y	Y	Y	Y	AREA/LAN	VTAM ID			Y		Y		D	S	TIME	E53C
	Y	Y	Y	Y	AREA/LAN	VTAM ID			Y		Y		D	S	TIME	E54C
MISS RECEIVING	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	D42Z
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	LB3B
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	LB5R
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	LB5Z
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	PE9B
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RN42
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RN46
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RI62
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RI67
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RI68
REJECT ROUTING	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RI71
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RI72
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RI74
	Y	Y	Y	Y	VTAM ID				Y				D	S	TIME	RI78
	Y	Y	Y	Y	REJECT	VTAM ID			Y				D	P	TIME	WM05
	Y	Y	Y	Y	REJECT	VTAM ID			Y				D	P	TIME	WM06
	Y	Y	Y	Y	REJECT	VTAM ID			Y				D	P	TIME	BN3V
Y109 MOVES	Y	Y	Y	Y	AWOS	VTAM ID	Y						D	P	TIME	BN1A
	Y	Y	Y	Y	AWOS	VTAM ID	Y						D	P	TIME	BN2H
	Y	Y	Y	Y	AWOS	VTAM ID	Y						D	P	TIME	BN2K
	Y	Y	Y	Y	VTAM ID	Y							D	P	TIME	B2BE
	Y	Y	Y	Y	VTAM ID	Y							D	P	TIME	B2BG
	Y	Y	Y	Y	VTAM ID	Y							D	P	TIME	B29C
	Y	Y	Y	Y	VTAM ID	Y							D	P	TIME	RFPE

DISTRIBUTION STANDARD SYSTEM
Equipment Control System

September 8, 2004

SMM	Session ID	SEQ	Con No	Ship U No	WRHS Loc	Destination	Source	2 nd Dest	3 rd Dest	Conv	2 nd Conv	Hndlq Unit	IPC Flag	Type	Date	PGU
PICKING	Y	Y	Y	Y	Y	VTAM ID	Y						D	P	TIME	RFTA
	Y	Y	Y	Y	Y	VTAM ID		Y					Y	D	TIME	D42B
	Y	Y	Y	Y	Y	VTAM ID		Y					Y	D	TIME	Q24J
	Y	Y	Y	Y	Y	Work Sta		Y					Y	D	TIME	RFE2
	Y	Y	Y	Y	Y	Work Sta		Y					Y	D	TIME	RFPI
	Y	Y	Y	Y	Y	Work Sta		Y					Y	D	TIME	RFPQ
PACKING	Y	Y	Y	Y	Y	Work Sta		Y					Y	D	TIME	RVPQ
	Y	Y	Y	Y	Y	VTAM ID		Y					Y	D	TIME	WM04
	Y	Y	Y	Y	Y	VTAM ID		Y					N	P	TIME	WM25
	Y	Y	Y	Y	Y	VTAM ID	Y									
	Y	Y	Y	Y	Y	VTAM ID		Y						D	TIME	BN1A
	Y	Y	Y	Y	Y	VTAM ID		Y						D	TIME	BN1F
	Y	Y	Y	Y	Y	VTAM ID		Y						D	TIME	BN2H
	Y	Y	Y	Y	Y	VTAM ID		Y						D	TIME	BN2K
	Y	Y	Y	Y	Y	VTAM ID		Y						D	TIME	B2BE
	Y	Y	Y	Y	Y	Work Sta		Y						D	TIME	RFBB
	Y	Y	Y	Y	Y	Work Sta		Y						D	TIME	RFBC
	Y	Y	Y	Y	Y	Work Sta		Y						D	TIME	RFKB
DIMENSION/ WGH	Y	Y	Y	Y	Y	Work Sta		Y								
	Y	Y	Y	Y	Y	VTAM ID	Y	Y					Y	D	TIME	B29C
	Y	Y	Y	Y	Y	VTAM ID		Y								
REQ FOR MOD	Y	Y				LOADED	WHSE/AIS						Y	D	TIME	B29E
	Y	Y				LOADED	WHSE/AIS						S	P	TIME	RFWD
MOD PICKUP	Y	Y				LOADED	STAND ID						S	P	TIME	RVWD
REQ													S		TIME	RFWD
MOD SWAP	Y	Y				LOADED	STAND ID						S		TIME	RVWD
EMER MRO	Y	Y				LOADED	STAND ID						A	A	TIME	SMC4
PACK ARRIVAL	Y	Y				CAR/LOC	AREA/LN						P	K	TIME	BN3M
QUERY	Y	Y					Work Sta						Q		TIME	RFE2
TRANS SHIPS	Y	Y					VTAM ID						Q		TIME	WM38
							Work Sta						D	P	TIME	RFTA

2.0

RETRIEVE FROM STORAGE REQUEST

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXX
Control Number	XXXXXX
Consolidation Field	XXXXXXXXXXXXXXXX
From Shipment Unit Number	OR DODAAC OR Project Code
Location	From Warehouse location W = Warehouse BB = Bay AA = Aisle Number SSS = Segment (odd on left, even on right) LL = Level DD = (01=Far, 02=Near) or CC Tray Compartiment
Destination	Full, Partial, Vtam Terminal ID, Vtam Terminal ID + Left/Right Indicator
Source	VTAM Terminal ID, Full
Alternate Destination	
Second Alternate. Destination	
Chain Structure	
Conveyance	Pallet ID, Tray ID
Second Conveyance	
Handling Unit	
Priority	
Flag	R=Request, E=Emergency
Option	
Work Type	P = Picking, L = Location Survey, C = Inventory, I = Inspection, S = Stow, M= Manual
Quantity	
Date time Stamp	XXXXXXX
Program ID	RFE2, WM02, WM18, WM38

3.0

RETURN TO STORAGE (COMPLETION)

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXX
Control Number	XXXXXXX
Consolidation Field	XXXXXXXXXXXXXXXX
Location	From Warehouse location W = Warehouse BB = Bay AA = Aisle Number SSS = Segment (odd on left, even on right) LL = Level DD = (01=Far, 02=Near)
Destination	1st 9 characters of location
Source	VTAM Terminal ID, Full
Alternate Destination	
Second Alternate. Destination	If the Stretch indicator is set, the word, STRETCH, will be placed in the field
Chain Structure	
Conveyance	Pallet ID, Tray ID
Second Conveyance	
Handling Unit	
Priority	
Flag	C=Completion, E=Emergency
Option	
Work Type	P = Picking, L= Location Survey, C = Inventory, I =Inspection, S=Stow, T= Take Conveyor Away, M=Manual
Quantity	
Date time Stamp	XXXXXXX
Program ID	Q175, RVWF, WM06, RFWF

4.0 **WORKSTATION DESIGNATION**

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXXX
Control Number	
Consolidation Field	
Location	
Destination	
Source	VTAM Terminal ID, Full
Alternate Destination	
Second Alternate. Destination.	
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	
Flag	'Z' Workstation Designation
Option	
Work Type	P = Picking, L= Location Survey, C = Inventory, I =Inspection, S= Stows, blank=Clear all types
Quantity	
Date time Stamp	XXXXXXXX
Program ID	WM18, WM38

5.0 **CLEAR WORKLOAD (NON-DEDICATED WORK STATIONS)**

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXX
Control Number	
Consolidation Field	
Location	
Destination	
Source	VTAM Terminal ID
Alt. Destination	
Second Alt. Destination	
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	
Flag	'Z'
Option	
Work Type	'N'
Quantity	
Date time Stamp	XXXXXXX
Program ID	WM18, WM38

6.0 **CLEAR WORKLOAD (DEDICATED WORK STATIONS)**

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXX
Control Number	
Consolidation Field	
Location	From Warehouse location W = Warehouse BB = Bay AA = Aisle Number
Destination	
Source	VTAM Terminal ID
Alternate Destination	
Second Alternate. Destination.	
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	
Flag	W
Option	
Work Type	
Quantity	
Date time Stamp	XXXXXXX
Program ID	WM02, SECI

7.0 **PALLET TRANSFER (CSF)**

Field Name	Data
Session ID	ECXX
Sequence Number	XXXXXXX
Control Number	
Consolidation Field	
Location	From Warehouse location W = Warehouse BB = Bay AA = Aisle Number SSS = Segment (odd on left, even on right) LL = Level DD = (01=Far, 02=Near)
Destination	To Warehouse location AA = Aisle Number SSS = Segment (odd on left, even on right) LL = Level DD = (01=Far, 02=Near)
Source	
Alternate Destination	
Second Alternate. Destination.	
Chain Structure	
Conveyance	Pallet ID
Second Conveyance	
Handling Unit	
Priority	0
Flag	T
Option	
Work Type	T = Transfer
Quantity	
Date time Stamp	XXXXXXX
Program	WM31

8.0 **COMPLETIONS**

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXX
Control Number	XXXXX
Consolidation Field	
Location	
Destination	
Source	AWOS, VTAM ID
Alternate Destination.	
Second Alternate. Destination	
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	
Flag	C
Option	
Work Type	P
Quantity	
Date time Stamp	XXXXXXX
Program	QM12, B32R, B35B, RFS1, B37C, RFS5, B36A, BN1A, BN1X, BN2H, BN2K, BN4A, RFKB

9.0 **AWOS ROUTING**

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXX
Control Number	XXXXX
Consolidation Field	
Location	
Destination	First AWOS divert
Source	VTAM Terminal ID, LU ID
Alternate Destination	Second AWOS divert
Second Alternate. Destination.	Third AWOS divert
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	
Flag	G
Option	
Work Type	P
Quantity	
Date time Stamp	XXXXXXX
Program	SPC1, SPC2, SPC5, SPC8

10.0 CCP RECEIVING ROUTING

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXXX
Control Number	XXXXX
Consolidation Field	
Location	Door Yard Location, Outload Location, Pack Area and Pack Lane or spaces
Destination	Pack Area and Pack Lane
Source	VTAM Terminal ID
Alternate Destination	
Second Alternate. Destination.	
Chain Structure	
Conveyance	Tote ID, Cart ID
Second Conveyance	
Handling Unit	T=Tote L=Conveyable P=Pallet B=Bulk O=Oversize M=Multi-pack N=Nonconveyable
Priority	
Flag	D
Option	
Work Type	S
Quantity	
Date time Stamp	XXXXXXXX
Program	E53B, E53C, E54C

11.0 MISSION RECEIVING ROUTING

<u>Field Name</u>	<u>Data</u>
Session ID	ECXX
Sequence Number	XXXXXXXX
Control Number	XXXXX
Consolidation Field	
Location	Warehouse Location
Destination	1st 9 characters of location
Source	VTAM Terminal ID
Alternate Destination	
Second Alternate. Destination.	
Chain Structure	
Conveyance	Tote ID, Cart ID, SPLIT, Control Number
Second Conveyance	
Handling Unit	
Priority	
Flag	D
Option	
Work Type	S
Quantity	
Date time Stamp	XXXXXXXX
Program	RI71, RI72, RI74, LB3B, LB5R, PE9B, RI67, RN46, RI78, RN42, LB52, RI68, D42Z, RI62

12.0 **REJECT ROUTING**

Field Name	Data
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	XXXXX
Consolidation Field	
Location	
Destination	REJECT
Source	VTAM Terminal ID
Alternate Destination	
Second Alternate. Destination.	
Chain Structure	
Conveyance	Pallet ID
Second Conveyance	
Handling Unit	
Priority	
Flag	D, G
Option	
Work Type	P = Picking, S = Stow, T=Take Away Conveyance
Quantity	
Date time Stamp	XXXXXXX
Program	WM04, WM05, BN3V

13.0 **Y-109 MOVE REQUEST**

Field Name	Data
Session ID	ECXX
Sequence Number	XXXXXXX
Control Number	XXXXXX
Consolidation Field	XXXXXXXXXXXXXXXX
	Shipment Unit Number
	OR DODAAC
	OR Project Code
Location	XXXXXXXXXX
Destination	Pallet Lane ID (see Building Y109 Destination Table 13.1-1), AWOS
Source	VTAM Terminal ID Or Source
Alternate Destination	Sorter Chute ID (see Building Y109 Destination Table 13.1-1)
Second Alternate. Destination	
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	
Flag	D =Normal Movement
Option	
Work Type	P
Quantity	
Date time Stamp	XXXXXXXX
Program ID	BN1A, BN2H, BN2K, B2BE, B2BG, B29C, RFPE, RFTA, WM04

Note: **Boldface fields** are required for ECS material movement in Y-109.

13.1 **Building Y109 Destination Table**

BUILDING Y-109 DESCRIPTION	DSS TO ECS DESTINATION	ECS TO PLC DESTINATION
Scanner at Automatic Sortation For Pallet Rack Storage	N/A	100
Pallet Rack Storage Lane 1	109YR001	101
Pallet Rack Storage Lane 2	109YR002	102
Pallet Rack Storage Lane 3	109YR003	103
Pallet Rack Storage Lane 4	109YR004	104
Pallet Rack Storage Lane 5	109YR005	105
Pallet Rack Storage Lane 6	109YR006	106
Pallet Rack Storage Lane 7	109YR007	107
Pallet Rack Storage Default Lane	N/A	199
Scanner at Automatic Sortation For Case/Tote	N/A	300
Sorter Chute 1	109YS001	301
Sorter Chute 2	109YS002	303
Sorter Chute 3	109YS003	305
Sorter Chute 4	109YS004	307
Sorter Chute 5	109YS005	309
Sorter Chute 6	109YS006	311
Sorter Chute 7	109YS007	313
Sorter Chute 8	109YS008	315
Sorter Chute 9	109YS009	317
Sorter Chute 10	109YS010	319
Sorter Chute 11	109YS011	321
Sorter Chute 12	109YS012	323
Sorter Chute 13	109YS013	325
Sorter Chute 14	109YS014	327
Sorter Chute 15	109YS015	329
Sorter Chute 16	109YS016	331
Sorter Chute 17	109YS017	333
Sorter Chute 18	109YS018	335
Sorter Chute 19	109YS019	302
Sorter Chute 20	109YS020	304
Sorter Chute 21	109YS021	306
Sorter Chute 22	109YS022	308
Sorter Chute 23	109YS023	310
Sorter Chute 24	109YS024	312

BUILDING Y-109 DESCRIPTION	DSS TO ECS DESTINATION	ECS TO PLC DESTINATION
Sorter Chute 25	109YS025	314
Sorter Chute 26	109YS026	316
Sorter Chute 27	109YS027	318
Sorter Chute 28	109YS028	320
Sorter Chute 29	109YS029	322
Sorter Chute 30	109YS030	324
Sorter Chute 31	109YS031	326
Sorter Chute 32	109YS032	328
Sorter Chute 33	109YS033	330
Sorter Chute 34	109YS034	332
Sorter Chute 35	109YS035	334
Sorter Chute 36	109YS036	336
Sorter Chute 37	109YS037	337
Sorter Chute 38	109YS038	338
Sorter Chute 39	109YS039	339
Sorter Chute 40	109YS040	340
Sorter Default Lane	N/A	399
Scanner at Automatic Sortation For Pallet Rack Storage	N/A	100

Table A-1 Building Y109 Destination Table

14.0 **ROUTING FROM PICKING**

Field Name	Data
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	XXXXXX
Consolidation Field	XXXXXXXXXXXXXXXX
Location	From Warehouse location W= Warehouse BB=Bay AA=Aisle Number SSS=Segment (odd on left, even on right) LL=Level DD=(01=Far, 02=Near)
Destination	AWOS, SURC, Pack Area/Lane, Local Delivery Chute ID, Warehouse Location
Source	VTAM Terminal ID, Workstation
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	Conveyance ID, Control Number
Second Conveyance	Pallet ID
Handling Unit	
Priority	1, 2, 3 or blank
Flag	D, N
Option	
Work Type	P= Picking
Quantity	
Date Time State	XXXXXXX
Program ID	D42B, Q24J, RFE2, RFPI, RFPQ, RVPQ, WM04, WM25

15.0 **ROUTING FROM PACKING**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	XXXXXX
Consolidation Field	XXXXXXXXXXXXXXXX
Location	
Destination	AWOS, Spur ID
Source	VTAM Terminal ID, Spur ID
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	Conveyance ID, Control Number
Second Conveyance	
Handling Unit	
Priority	
Flag	D
Option	
Work Type	P= Picking
Quantity	
Date Time State	XXXXXXX
Program ID	BN1A, BN1F, BN2K, B2BE, BN2H, RFBB, RFBC, RFKB

16.0 **ROUTING FROM DIMENSION AND WEIGH**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	XXXXXX
Consolidation Field	
Location	
Destination	Door Yard Location, Floor Pack Area, Local Delivery Chute ID, SURC
Source	VTAM Terminal ID
Alternate Destination	
Second Alternate Destination	Bypass, Stretch, Banding, Blanks
Chain Structure	
Conveyance	
Second Conveyance	Conveyance ID, Control Number
Handling Unit	
Priority	1, 2, 3 or blank
Flag	D
Option	
Work Type	P= Picking
Quantity	
Date Time State	XXXXXXX
Program ID	B29C, B29E

17.0 **REQUEST FOR STOW MODULE**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	
Consolidation Field	
Location	
Destination	LOADED
Source	Warehouse Aisle
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	
Second Conveyance	User ID
Handling Unit	
Priority	
Flag	S
Option	
Work Type	P
Quantity	
Date Time State	XXXXXXX
Program ID	RFWD, RVWD

18.0 **LOAD A STAND AND REQUEST PICKUP**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	
Consolidation Field	
Location	
Destination	LOADED
Source	Stand ID
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	
Second Conveyance	User ID
Handling Unit	
Priority	
Flag	S
Option	
Work Type	A
Quantity	
Date Time State	XXXXXXX
Program ID	RFWD, RVWD

19.0 **REQUEST FOR STOW MODULE**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	
Consolidation Field	
Location	
Destination	LOADED
Source	Warehouse Aisle
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	
Second Conveyance	User ID
Handling Unit	
Priority	
Flag	S
Option	
Work Type	P
Quantity	
Date Time State	XXXXXXX
Program ID	RFWD, RVWD

20.0 **ON LINE MRO SUBMITTAL**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	XXXXXXX
Consolidation Field	XXXXXXXXXXXXXXXX
Location	From Warehouse location W= Warehouse BB=Bay AA=Aisle Number SSS=Segment (odd on left, even on right) LL=Level DD=(01=Far, 02=Near)
Destination	Pack Area/Lane, Local Delivery Chute ID
Source	VTAM Terminal ID
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	1, 2, 3 or blank
Flag	E
Option	
Work Type	A=Emergency
Quantity	
Date Time State	XXXXXXX
Program ID	SMC4

21.0 **ON LINE MRO SUBMITTAL**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	XXXXXXX
Consolidation Field	XXXXXXXXXXXXXXXXXX
Location	
Destination	Carousel Location
Source	Pack Area/Lane
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	
Flag	P
Option	
Work Type	K
Quantity	
Date Time State	XXXXXXX
Program ID	BN3M

22.0 **ON LINE MRO SUBMITTAL**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	
Consolidation Field	
Location	
Destination	
Source	VTAM ID, Workstation ID
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	
Second Conveyance	
Handling Unit	
Priority	
Flag	Q
Option	
Work Type	
Quantity	
Date Time State	XXXXXXX
Program ID	RFE2, WM38

23.0 **ON LINE MRO SUBMITTAL**

<u>Field Name</u>	<u>Data</u>
Session ID	ECJ2
Sequence Number	XXXXXXX
Control Number	
Consolidation Field	
Location	
Destination	Location Delivery Chute ID
Source	VTAM ID, Workstation ID
Alternate Destination	
Second Alternate Destination	
Chain Structure	
Conveyance	Control Number, Tote ID
Second Conveyance	
Handling Unit	
Priority	
Flag	D
Option	
Work Type	P
Quantity	
Date Time State	XXXXXXX
Program ID	RFTA

LIST OF EFFECTIVE PAGES
Interface Design Description

Date of issue for revision and changed pages is:

	Revision 0/Change 1.....02/16/96
	Revision 1/Change 0.....01/24/97
	Revision 1/Change 1.....03/01/97
	Revision 2/Change 0.....02/27/98
	Revision 2/Change 1.....04/08/98
	Revision 3/Change 0.....05/10/99
	Revision 4/Change 0.....10/15/99
*Not distributed	Revision 5/Change 0.....01/25/00
	Revision 6/Change 0.....09/26/00
	Revision 6/Change 1.....02/15/01
	Revision 7/Change 0.....06/08/01
	Revision 7/Change 1.....09/05/01
	Revision 7/Change 2.....12/14/01
	Revision 7/Change 3.....03/25/02

TOTAL NUMBER OF PAGES IN THIS REVISION IS THE ENTIRE DOCUMENT,
CONSISTING OF THE FOLLOWING:

PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 3	Updated Change number and the date.
Table of content	7/Change 3	Updated to reflect changes in association with SCR DSS-RE2-017.
3-1	7/Change 3	Updated Figure 3-1 to include changes in association with SCR# DSS-RE2-017.
3-16	7/Change 3	Updated SECS-RI8.0 to reflect changes in association with SCR DSS-DC9-910.
3-19	7/Change 3	Updated Address-To/Address-From Values table to reflect changes in association with SCR DSS-RE2-017. Added TRIAX reference and Active Item reference overlooked in previous change.
3-26 thru 3-27	7/Change 3	Updated tables to reflect changes in association with SCR DSS-RE2-017.
3-94	7/Change 3	Added section 3.1.31 in association with SCR# SS-RE0-049 DAWS/AWOS at DDHU.
3-95	7/Change 3	Added section 3.1.32 in association with SCR# DSS-RT0-050 AWOS at DDRT.

PAGE NO.	REV. NO.	REASON FOR CHANGE
3-96	7/Change 3	Added section 3.1.33 in association with SCR# DSS-RE2-017 DPI at DDNV
3-97	7/Change 3	Added section 3.1.34 in association with SCR# DSS-OO0-132
3-99	7/Change 3	Added section 3.1.35 in association with SCR# DSS-RE2-016
A-13	7/Change 3	Added section 12.0 to Appendix A in association with SCR# DSS-RE2-016

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 4.....05/22/02

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 4	Updated Change number and the date.
Table of content	7/Change 4	Updated to reflect changes in association with SCR DSS-RE2-016.
3-1	7/Change 4	Updated Figure 3-1 to include changes in association with SCR# DSS-RE2-016.
3-99 through 3-103	7/Change 4	Added section 3.1.35 - SECS-RI35.0: DNV Y109 Interface in association with SCR# DSS-RE2-016.
A-13	7/Change 4	Added section 12.0 to Appendix A in association with SCR# DSS-RE2-016.

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 5.....07/12/02

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 5	Updated Change number and the date.
Table of content	7/Change 5	Updated to reflect changes throughout document.
2-1	7/Change 5	Updated entire section 2.0 Referenced Documents.
3-1	7/Change 5	Updated Figure 3-1 in association with SCR# DSS-PW0-131.
3-107	7/Change 5	Added section 3.1.36 - SECS-RI36 SECS-RI36.0: DDPW PS Tote Conveyor Interface SCR# DSS-PW0-131
A-15	7/Change 5	Added PS Tote SMM Format to Appendix A - in association with SCR# DSS-PW0-131.

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 6.....10/18/02

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 6	Updated Change number and the date.
Table of content	7/Change 6	Updated to reflect changes throughout document.
3-104 thru 3-106	7/Change 6	Added SECS-RI37.0 Air Force HKU ASRS changes in association with SCR# DSS-RE2-021

LIST OF EFFECTIVE PAGES

Interface Design Description

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Revision 7/Change 7.....12/28/02

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 7	Updated Change number and the date.
Table of content	7/Change 7	Updated to reflect changes throughout document.
3-9 thru 3-1	7/Change 7	Updated SECS-RI4.0 Navy Stackman data. Changes are in association with SCR# DSS-DC0-996

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 8.....03/20/03

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 8	Updated Change number and the date.
Table of content	7/Change 8	Updated to reflect corrections to table and section reference. Change to revision to correct table of content references to data throughout document.

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 9.....05/09/03

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 9	Updated Change number and the date.
Table of content	7/Change 9	Updated to reflect changes throughout document.
3-22	7/Change 9	Updated ECS Generic Internal Message table. Changes in association with SCR# DSS-JC3-008 and DSS-TR1-036

LIST OF EFFECTIVE PAGES

Interface Design Description

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Revision 7/Change 9.....05/09/03

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 10	Updated Change number and the date.
Table of content	7/Change 10	Updated to reflect changes throughout document.
1-1	7/Change 10	Updated paragraph 1.2 System Overview to include Stackman and Mission/CCP sorter references.
2-1	7/Change 10	Updated section 2.0 in association with SCR# DSS-JC3-008.
3-108 thru 3-110	7/Change 10	Added paragraphs 3.1.38 thru 3.1.38.8, to include Mission/CCP Sorter data. Changes in association with SCR #DSS-JC3-008.

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 11.....08/29/03

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 11	Updated Change number and the date.
Table of content	7/Change 11	Updated to reflect changes throughout document.
1-1	7/Change 11	Updated paragraph 1.2 System Overview to include DDMA.
3-1	7/Change 11	Updated figure 3-1 Interface Context Diagram.
3-111	7/Change 11	Added paragraphs 3.1.39 thru 3.1.39.2, in association with SCR# DSS-MA2-116.

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 12.....10/22/03

TOTAL NUMBER OF PAGES IN THIS REVISION IS THE ENTIRE DOCUMENT,
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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 12	Updated Change number and the date.
Table of content	7/Change 12	Updated to reflect changes throughout document.
1-1	7/Change 12	Updated paragraph 1.2 System Overview to include DDDE.
3-1	7/Change 12	Updated figure 3-1 Interface Context Diagram.
3-111	7/Change 12	Added paragraphs 3.1.40 thru 3.1.40.2, in association with SCR# DSS-RE2-132.

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Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 13.....12/17/03

TOTAL NUMBER OF PAGES IN THIS REVISION IS THE ENTIRE DOCUMENT,
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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 13	Updated Change number and the date.
Table of content	7/Change 13	Updated to reflect changes throughout document SCR# DSS-RE3-095.
3-98 thru 3-99	7/Change 13	Added paragraphs 3.1.34 thru 3.1.34.2.

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 14.....04/14/04

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 14	Updated Change number and the date.
Table of content	7/Change 14	Updated to reflect changes throughout document.
1-2	7/Change 14	Added reference to AWOS changes at DDSP. Changes in association with SCR# DSS-SP3-106.
3-27	7/Change 14	Added T50 and T52 Message IDs. Changes in association with SCR# DSS-SP3-106
3-107	7/Change 14	Corrected Store Pan ECS →Message format Pan ID.

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Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 15.....05/28/04

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 15	Updated Change number and the date.
Table of content	7/Change 15	Updated to reflect changes throughout document.
Appendix A	7/Change 15	Corrected missing footer errors throughout Appendix A. No updates to data.

LIST OF EFFECTIVE PAGES

Interface Design Description

Date of issue for revision and changed pages is:

Revision 7/Change 16.....09/08/04

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PAGE NO.	REV. NO.	REASON FOR CHANGE
COVER	7/Change 16	Updated Change number and the date.
Table of content	7/Change 16	Updated to reflect changes throughout document.
3-95	7/Change 16	Added changes for section 3.1.30 HKS ASRS Stacker. Changes in association with SCR # DSS-RE4-037, ACT 120509